

Effectiveness of Peyton's Four-Step Teaching Method Versus Conventional Teaching in Airway Management Skills Training Among Undergraduate Healthcare Students

Mohana Sundari. P¹, T.V Ramakrishnan^{2*}, Ramya Ramakrishnan³, Nirmhalaa. T.N⁴, Krishna Kumar Dharuman⁵, Deepika Saicholan⁶

¹Assistant Professor, Department of Trauma Care Management, Faculty of Allied Health Sciences, Sri Ramachandra Institute of Higher Education and Research, Porur, Chennai.

^{2*}Professor and Head of Emergency Medicine, Department of Emergency Medicine, Sri Ramachandra Institute of Higher Education and Research, Porur, Chennai.

³Associate Dean Academics and Professor of Surgery, Apollo Institute of Medical Sciences and Research, Chittoor.

⁴Assistant Professor, Department of Trauma Care Management, Faculty of Allied Health Sciences, Sri Ramachandra Institute of Higher Education and Research, Porur, Chennai.

⁵Assistant Professor, Department of Emergency Medicine, Institute of Allied Health Sciences, Srinivas University, Mukka, India.

⁶Assistant Professor, Department of Trauma Care Management, Faculty of Allied Health Sciences, Sri Ramachandra Institute of Higher Education and Research, Porur, Chennai.

***Corresponding Author:** Dr. T.V Ramakrishnan

Background: Teaching methods are critical in imparting both practical and theoretical knowledge. Skills-lab teaching provides a safe environment for health professional students to practice procedures. Peyton's Four-Step Method—demonstration, deconstruction, comprehension, and performance—is a contemporary teaching strategy shown to enhance procedural skills more effectively than conventional methods.

Objective: This study compared Peyton's Four-Step Method with conventional teaching methods in developing procedural skills and knowledge among paramedic students.

Methods: A prospective observational study was conducted at the Skills Lab, Sri Ramachandra Institute of Higher Education and Research, Chennai, from April to July 2023. Thirty-six first-year B.Sc. Trauma Care Management and Nursing students were randomly divided into two groups: Conventional group (conventional teaching) and Peyton group (Peyton's Four-Step Method). Training included oropharyngeal airway insertion, nasopharyngeal airway insertion, and bag mask ventilation. Assessments included Objective Structured Clinical Examination (OSCE) and Multiple-Choice Questions (MCQs).

Results: Peyton group outperformed the Conventional group in all skills assessed: oropharyngeal airway ($p = 0.045$), nasopharyngeal airway ($p = 0.06$), and bag mask ventilation ($p = 0.01$). While the Peyton group scored better in knowledge assessments, the difference was not statistically significant ($p = 0.45$). Feedback showed higher satisfaction in Peyton group, particularly regarding expectations, knowledge application, and instruction quality.

Conclusions: Peyton's Four-Step Method enhanced procedural skills, knowledge retention, and student satisfaction compared to conventional methods. The structured approach promoted engagement and better performance. Further research is needed to evaluate long-term retention and broader applications of this method in health professional education.

Keywords: Peyton's Four-Step Method, skills-lab education, procedural skills, health professional education, skill acquisition

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Introduction:

Teaching methods are techniques used to help students achieve learning outcomes, with instructors identifying appropriate methods to support specific outcomes. Teaching aims to deepen understanding, maintain active participation, provide real-life experiences, enhance learning, and raise motivation. Skills-lab teaching is widely used in medical faculties as a systematic strategy. Skills labs provide a safe, "mistake-forgiving" environment for practicing procedures on mannequins, standardized patients, or peers before performing on real patients, improving procedural skills in novices and

experts alike, including complex surgical and basic clinical skills.¹

Peyton's stepwise teaching methodology is a contemporary method for acquiring procedural abilities, comprising four steps: demonstration, deconstruction, comprehension, and performance.¹ It has been proven superior to conventional instruction in skills-lab education during undergraduate medical training.² The method enhances accurate and faster performance, making it valuable for teaching procedural skills and accommodating various learning styles.¹

Motor learning concepts like mental practice, augmented feedback, and specific training regimens

facilitate skill acquisition.¹ Cognitive factors such as attentional focus, visuospatial abilities, performance monitoring, and memory retention influence motor skill development.² Peyton's third step, involving motor imagery, verbalization, and teaching the teacher, is hypothesized to deepen declarative language processing of individual processes, aligning with Cognitive Theory.² Key elements for effective skills-lab education include reliable scenarios, purposeful practice, feedback, predetermined goals, and curricular integration.³

Studies indicate that Peyton's Four-Step Method is superior to conventional training in terms of competence and accompanying doctor-patient contact. It also results in more rapid performance when students use what they have learned for the first time.⁴

Furthermore, research highlights that Peyton's 4-step instructional strategy effectively helps students develop procedural skills in health professions education, particularly when used in small groups with fewer students per instructor. The method's efficacy is less pronounced when fellow students or student tutors act as teachers.¹

Additionally, findings suggest that a modified video-

based version of Peyton's 4-Step Approach is superior to the "See One, Do One" approach for teaching complicated motor skills. This method demonstrates the potential for effective group instruction and cost-efficient resource utilization.⁵

In the context of CPR skill training, Peyton's 4-Step Approach provides a structured method for acquiring skills. The study observed differences in medium-term retention of learning external chest compression among varied approaches, with Peyton's method showing promise.⁶ Moreover, evidence shows that Peyton's third step significantly contributes to student achievement in procedural skill learning, surpassing other steps and emphasizing the importance of guided practice beyond repetitive demonstrations.² The purpose of this study is to compare the effectiveness of two alternative instructional strategies for teaching procedural-technical skills, focusing on learning outcomes. Specifically, the study aims to introduce Peyton's 4-step method of teaching skills to paramedic students, compare this method with the conventional instructional approach, and obtain feedback from the students regarding their experiences with the instructional method.

Peyton's Teaching Approach:

Peyton's teaching approach is a stepwise teaching approach and consists of the following four steps:

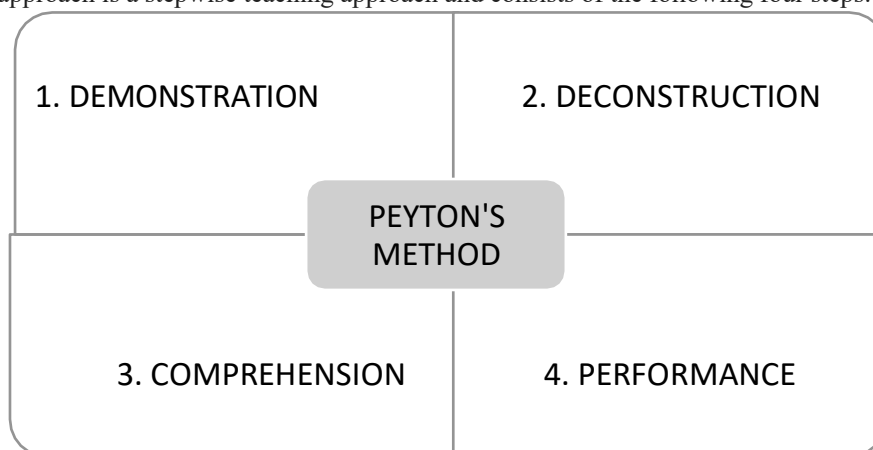


Figure 1: Peyton's Teaching Approach

- (i) Step 1: Refers to the demonstration of the whole procedure in real time ("demonstration");
- (ii) Step 2: The teacher repeats the demonstration but this time all procedural sub-steps are described ("deconstruction");
- (iii) Step 3: The student talks the teacher through the procedure. The teacher performs the procedure under the guidance of the student ("comprehension") and
- (iv) Step 4: The students carry out the procedure on their own initiative ("performance").¹

Methods:

Study Design

This prospective, comparative interventional study was conducted at the Skills Laboratory of Sri Ramachandra

Institute of Higher Education and Research, Porur, Chennai, between April and July 2023.

Study Setting and Participants

Undergraduate students from the B.Sc. Nursing and B.Sc. Trauma Care Management programs were invited to participate. A total of 36 first-year students volunteered and were included. Eligibility criteria required that participants had no prior formal training in airway management. Participation was voluntary, and written informed consent was obtained from all students.

Students were randomly assigned into two equal groups of 18 participants each. The Conventional group received training with using conventional methods (interactive lectures and video demonstrations), while

the Peyton's group received the same instructional content supplemented by Peyton's Four-Step Approach.

The training module was designed to cover three critical airway management skills:

- Insertion of the oropharyngeal airway (OPA)
- Insertion of the nasopharyngeal airway (NPA)
- Bag–valve–mask ventilation (Ambu bag technique)

Teaching and Training Procedures

Participants were divided into two instructional groups, with each group receiving training in the same procedures but through different teaching approaches.

Conventional Instruction:

In this approach, students were trained through an interactive lecture, supported with video demonstrations and direct hands-on teaching by the investigator. The lecture introduced the theoretical foundations of airway management, including airway anatomy, clinical indications, contraindications, and possible complications. After this classroom component, each of the three procedures was demonstrated in the skills laboratory. The investigator carried out the procedure on the manikin while explaining each step in detail at the same time. Demonstration and explanation were provided side by side, allowing learners to connect theory with practice. Immediately afterward, students were invited to perform the procedure themselves on the manikin, with close supervision and corrective feedback.

• **Oropharyngeal Airway (OPA) Insertion** – The investigator explained patient positioning, correct airway sizing, and the insertion technique, while simultaneously demonstrating the procedure on the manikin. Each student then practiced OPA insertion, with guidance and immediate correction provided where necessary.

• **Nasopharyngeal Airway (NPA) Insertion** – For NPA training, the investigator highlighted the indications, contraindications, and the importance of lubrication and proper sizing, while demonstrating the stepwise insertion method. Students subsequently practiced NPA insertion under observation, receiving feedback to improve accuracy and safety.

• **Bag–Valve–Mask (Ambu Bag) Ventilation** – Ambu bag ventilation was taught by explaining and demonstrating key aspects such as mask selection, patient positioning (head tilt, chin lift), achieving a proper mask seal, and delivering appropriate breaths. Students then practiced the technique, and their performance was corrected in real time to ensure effective ventilation.

Instruction Based on Peyton's Four-Step Method:

The second approach included the same interactive lecture and video demonstrations as described above. "In addition, In this instructional stream", students first received the same foundation of interactive lectures and video demonstrations as described earlier. To strengthen skill acquisition, Peyton's structured Four-Step

Approach was then applied for all three airway management procedures—Oropharyngeal Airway (OPA) insertion, Nasopharyngeal Airway (NPA) insertion, and Bag–Valve–Mask (Ambu bag) ventilation. This method emphasized a gradual transition from watching the skill to explaining it and finally performing it independently.

• **Oropharyngeal Airway (OPA) Insertion**

○ *Step 1 – Demonstration:* The investigator carried out the full OPA insertion silently, allowing students to watch the sequence without distraction and appreciate the overall flow of the procedure.

○ *Step 2 – Deconstruction:* The same procedure was repeated, broken into smaller steps, with detailed explanations on airway selection, patient positioning, and insertion technique. The importance of correct sizing, prevention of trauma, and ensuring patency was highlighted.

○ *Step 3 – Comprehension:* Each learner was then asked to verbally guide the investigator step by step, reinforcing both memory and logical sequencing of the procedure.

○ *Step 4 – Performance:* Finally, students inserted the OPA independently on the manikin. The investigator observed closely, offering immediate corrections and feedback to refine their skills.

• **Nasopharyngeal Airway (NPA) Insertion**

○ *Step 1 – Demonstration:* A complete NPA insertion was shown silently so that students could focus on the hand movements and sequence of the technique.

○ *Step 2 – Deconstruction:* The procedure was then explained step by step, including airway sizing, lubrication, correct angle of insertion, and patient safety precautions. Common errors and complications were also discussed.

○ *Step 3 – Comprehension:* Students guided the investigator verbally through each stage, reinforcing their understanding and ensuring they could recall the exact sequence accurately.

○ *Step 4 – Performance:* Each participant practiced NPA insertion on the manikin under direct supervision, with real-time feedback provided on hand positioning, insertion technique, and patient comfort considerations.

• **Bag–Valve–Mask (Ambu Bag) Ventilation**

○ *Step 1 – Demonstration:* The entire procedure, from patient positioning to mask seal and ventilation, was performed silently so that learners could observe the technique as a whole.

○ *Step 2 – Deconstruction:* The demonstration was repeated with detailed commentary. The investigator emphasized key elements such as head tilt–chin lift, mask placement, achieving an effective seal, and delivering appropriate tidal volumes. The importance of avoiding excessive pressure and ensuring visible chest rise was stressed.

○ *Step 3 – Comprehension:* Students verbally instructed the investigator step by step, reinforcing their theoretical and practical grasp of the procedure.

○ *Step 4 – Performance:* Finally, each student practiced Ambu bag ventilation independently on the

manikin. The investigator supervised closely and provided immediate corrections on technique, mask handling, and ventilation effectiveness.

This structured four-step process gave learners the opportunity to observe the full procedure, understand it in detail, recall the sequence actively, and then perform it independently under supervision. It ensured that all three essential airway management skills—OPA, NPA, and Ambu bag ventilation—were learned systematically and reinforced through active engagement and practice.

Knowledge Assessment Using Questionnaire

In addition to skills training, theoretical knowledge was assessed using a structured multiple-choice questionnaire (MCQ). The questionnaire included items on airway anatomy, indications and contraindications for OPA and NPA insertion, key principles of bag–valve–mask ventilation, and recognition of potential complications. The test was administered at the end of the training to evaluate the knowledge gained from the instructional sessions.

Skills Assessment

Practical abilities were assessed through the Objective Structured Clinical Examination (OSCE). Each participant was observed and scored while performing OPA insertion, NPA insertion, and bag–valve–mask ventilation on a manikin.

Blinding and Evaluation

To reduce the risk of bias, two independent examiners, blinded to the type of instruction each participant had received, evaluated both the MCQ results and OSCE performance. The scores were then compared to determine the relative impact of the two teaching strategies.

Data Collection and Assessment Tools

Primary outcomes:

- *Knowledge acquisition*, assessed using a structured multiple-choice questionnaire (MCQ) covering procedural steps, indications, contraindications, and complications.
- *Clinical skill performance*, assessed using an Objective Structured Clinical Examination (OSCE)

across standardized stations measuring accuracy, technique, safety, and adherence to guidelines.

Assessments were conducted by two trained examiners, blinded to Conventional group allocation, to minimize bias.

Secondary outcome:

- Long-term retention and application of skills, planned for follow-up during clinical placements.

Statistical Analysis

Statistical analysis was conducted using IBM SPSS Statistics Version 25.0. Descriptive statistics were applied to calculate means and distributions of outcome measures. Independent t-tests were used to compare continuous variables (MCQ and OSCE scores) between groups, while chi-square tests were applied for categorical variables. A p-value < 0.05 was considered statistically significant.

RESULTS:

The study evaluated the effectiveness of two teaching methods: the conventional method (Conventional group) and Peyton's 4-Step Method (Peyton group), among 36 participants, evenly divided into two groups of 18 students each, with a gender distribution of 17 males and 19 females. Participants were randomly assigned to the groups.

Results showed that Peyton group significantly outperformed Conventional group in skill performance and knowledge application. For oropharyngeal airway skills, The Peyton group achieved a higher mean score (7.06 ± 0.73) compared to Conventional group (6.33 ± 1.28), with a statistically significant p-value of 0.045. In bag mask ventilation, Peyton group demonstrated even greater improvement (8.50 ± 1.04) versus Conventional group (6.78 ± 1.63), with a p-value of 0.01. Nasopharyngeal airway scores were higher for Peyton group (6.56 ± 0.51) than Conventional group (5.83 ± 0.92), but the difference narrowly missed statistical significance ($p = 0.06$). In the knowledge-based MCQ test, Peyton group achieved a slightly better mean score (10.50 ± 1.79) than Conventional group (9.39 ± 1.38), although the difference was not statistically significant ($p = 0.45$). These findings are summarized in Table 1.

Table 1: Comparison of Skills Performance and Knowledge Assessment Between Conventional Teaching Method and Peyton's 4-Step Method

Skill	Group	Mean	SD	P-value
Oropharyngeal Airway	Conventional group	6.33	1.28	0.045
	Peyton group	7.06	0.73	
Nasopharyngeal Airway	Conventional group	5.83	0.92	0.06
	Peyton group	6.56	0.51	
Bag Mask Ventilation	Conventional group	6.78	1.63	0.01
	Peyton group	8.50	1.04	
Knowledge-Based MCQ Test	Conventional group	9.39	1.38	0.45
	Peyton group	10.50	1.79	

Statistically significant difference ($P < 0.05$)

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The independent samples t-test compared the performance of Conventional group (conventional method) and Peyton group (Peyton's 4-Step Method) for four measures: oropharyngeal airway, nasopharyngeal airway, bag mask ventilation, and knowledge scores. For the oropharyngeal airway skill, the p-value of 0.045 indicated a statistically significant difference, with Peyton group achieving higher scores. Similarly, for nasopharyngeal airway, Peyton group outperformed

Conventional group significantly ($p = 0.006$). The bag mask ventilation skill also showed a significant difference ($p = 0.001$), with Peyton group performing better. For the knowledge test, the p-value was 0.045, suggesting a significant improvement in Peyton group over Conventional group. These results confirm that Peyton's method significantly enhances both procedural skills and knowledge acquisition compared to conventional teaching.

Table 2 Independent Samples Test- Skill Performance and Knowledge Comparison: Peyton vs. Conventional

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	Df	p-value	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Oropharyngeal Airway	Equal variances assumed	10.774	.002	-2.079	34	.045	-.7222	.3475	-1.4284	-.0161
Nasopharyngeal airway	Equal variances assumed	5.160	.030	-2.903	34	.006	-.7222	.2488	-1.2279	-.2166
Bag mask Ventilation	Equal variances assumed	2.210	.146	-3.777	34	.001	-1.7222	.4559	-2.6488	-.7956
Knowledge	Equal variances assumed	1.330	.257	2.086	34	.045	1.1111	.5325	.0289	2.1933

Student feedback revealed a strong preference for Peyton's 4-Step Method. Peyton group reported significantly higher satisfaction levels across all evaluated aspects. For instance, 88.8% of Peyton group students strongly agreed that the demonstration met their expectations, compared to 27.7% in Conventional group. Additionally, 100% of Peyton group students strongly agreed that the training enabled them to apply the knowledge in their roles, compared to 66.6% in Conventional group. The quality of instruction, clarity of methodology, and attainment of learning objectives were also rated significantly higher by Peyton group, with over 94% strongly agreeing in these categories, compared to much lower percentages in Conventional group. Moreover, all students in Peyton group (100%) rated the overall skill demonstration as excellent, compared to 66.6% in Conventional group. Detailed feedback is presented in Table 3.

Table 3: Comparison of Student Feedback on Training Methods: Conventional vs Peyton's 4-Step Method

Statement	Variables	Conventional group	Peyton group
Satisfaction with the Demonstration	Strongly Agree	27.70%	88.80%
	Agree	55.50%	11.10%
	Neutral	16.60%	0%
	Disagree	0%	0%
Application of Knowledge	Strongly Agree	66.60%	100%
	Agree	27.70%	0%
	Neutral	5.50%	0%
	Disagree	0%	0%
Quality of Instruction	Strongly Agree	61.10%	83.30%
	Agree	27.70%	16.60%
	Neutral	11.10%	0%
	Disagree	0%	0%
Met Learning Objectives	Strongly Agree	66.60%	94.40%
	Agree	27.70%	5.50%
	Neutral	5.50%	0%
	Disagree	0%	0%

Effectiveness of Peyton’s Four-Step Teaching Method Versus Conventional Teaching in Airway Management Skills Training Among Undergraduate Healthcare Students

Methodology for Understanding	Strongly Agree	61.10%	94.40%
	Agree	33.30%	5.50%
	Neutral	5.50%	0%
	Disagree	0%	0%
Overall Rating of Skill Demonstration	Strongly Agree	66.60%	100%
	Agree	33.30%	0%
	Neutral	0%	0%
	Disagree	0%	0%

These findings demonstrate that Peyton's 4-Step Method significantly improves both procedural skills and student satisfaction compared to conventional teaching. Its structured and comprehensive approach makes it a highly effective teaching strategy, with potential for broader application and long-term benefits in skill acquisition.

Discussion:

Peyton’s four-step teaching approach, consisting of demonstration, deconstruction, comprehension, and performance, is deeply rooted in educational learning theories and has proven to be more effective for imparting practical skills than theoretical knowledge. A 2016 study examining spinal manipulation skills among medical students found that while both the Peyton and conventional teaching groups performed similarly on theoretical assessments, the Peyton group excelled significantly in practical skills, as evaluated by an Objective Structured Practical Examination (OSPE).⁷ Another study conducted in December 2020 assessed the effectiveness of Peyton’s method compared to conventional techniques for teaching antenatal examination skills. Peyton group, trained using Peyton's method, scored higher in the initial session (24.08±2.31) compared to Conventional group (20.32±3.59), demonstrating the superiority of the four-step method. Both groups, however, exhibited similar skill retention after subsequent training sessions, underscoring Peyton's impact on cognitive processing and long-term skill mastery. This study also highlighted Peyton's approach as a preferred method during the COVID-19 pandemic due to its structured and interactive nature, although it was noted to be more time-consuming than traditional methods.⁸

In a 2014 study, neonatal resuscitation training using Peyton’s four-step method resulted in significantly higher OSCE scores for medical students than the traditional two-step approach. Students in the Peyton's group benefited from enhanced hands-on experience, leading to improved practical competence and greater confidence in clinical applications. These findings were based on both theoretical and practical components of the OSCE, with maximum scores of 74 and 118, respectively, where the Peyton group outperformed the conventional group.⁹

Research on nursing students further validated the effectiveness of Peyton’s approach in improving practical skills, such as intramuscular injections and arterial punctures. Students found the methodology engaging, easy to understand, and conducive to learning

through repeated observations and feedback. Acceptance ratings were high, with students reporting increased confidence in independently performing procedures post-training. Advanced-level nursing students particularly benefited from this method, highlighting its role in fostering standardized and interactive learning environments.⁸

In the present study, Peyton’s method was compared to the conventional approach for teaching ventilation techniques involving oropharyngeal and nasopharyngeal airways and bag mask ventilation. Peyton group, taught using Peyton’s method, consistently outperformed Conventional group, instructed using conventional methods. For the oropharyngeal airway skill, Peyton group achieved significantly higher OSCE scores compared to Conventional group. Similarly, for nasopharyngeal airway skill and bag mask ventilation, Peyton group demonstrated statistically superior performance. In the assessment of knowledge through multiple-choice questions (MCQs), Peyton group also showed significant improvements over Conventional group.

Feedback from participants underscored the advantages of Peyton’s method. Regarding whether the demonstration met their expectations, 88.80% of Peyton group strongly agreed, compared to 27.70% in Conventional group. When asked about their ability to apply the knowledge in their roles, 100% of Peyton group strongly agreed, while Conventional group reported lower agreement. The quality of instruction received positive responses from both groups, with 83.30% of Peyton group strongly agreeing, compared to 61.10% in Conventional group. Similarly, the demonstration meeting learning objectives saw 94.40% of Peyton group strongly agreeing, compared to 66.60% in Conventional group.

Participants in Peyton group also reported greater understanding of the methodology, with 94.40% strongly agreeing, compared to 61.10% in Conventional group. In terms of participation and interaction, 100% of Peyton group strongly agreed that these were encouraged, while Conventional group had a slightly lower agreement rate of 77.70%. Adequate time for questions and discussions was noted positively in both groups, with 83.50% of Peyton group strongly agreeing, compared to 72.20% in Conventional group. Lastly, when rating the overall skill demonstration, 100% of Peyton group rated it as excellent, whereas 66.60% of Conventional group did the same.

Overall, this study reinforced the effectiveness of Peyton’s method in enhancing practical skills,

knowledge retention, and student satisfaction compared to conventional teaching methods

Limitations:

This study was conducted with a small group of students, which limits its generalizability to larger populations. Additionally, the time constraints posed challenges, as Peyton's method demands more instructional time compared to conventional methods due to its structured and sequential approach. Sustaining consistent student engagement throughout the process was also difficult, with some participants finding the hands-on learning methodology challenging.

Conclusion:

Peyton's four-step method is highly effective as a teaching strategy, especially for mastering complex motor skills. Its structured steps—demonstration, deconstruction, comprehension, and performance—promote deeper understanding and practical application of procedural skills. This approach works particularly well in small groups, where it enhances student engagement, self-confidence, and satisfaction. Compared to conventional methods, Peyton's method significantly improves skill acquisition and knowledge retention. Feedback from this study showed higher satisfaction levels among students taught with this approach, with 100% of Peyton's group rating the skill demonstration as excellent, compared to 66% in the conventional group. These findings highlight its effectiveness in delivering better learning outcomes. The study suggests a need for follow-up evaluations to assess long-term retention of skills gained through Peyton's method, providing valuable insights into its sustained impact and potential for broader curricular integration.

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Effectiveness of Peyton's Four-Step Teaching Method Versus Conventional Teaching in Airway Management Skills Training Among Undergraduate Healthcare Students

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