children

MDPI

Article

Combined Use of Point-of-View (POV) Video and Mental Practice Training Versus Standard Demonstration for Neonatal Laryngeal Mask Airway Insertion by Novice Healthcare Professionals: A Randomized Simulation Study

Cengizhan Yavuz [1], Emel Gündüz [2,*] and Gözen Öksüz [1]

[1] Department of Anesthesiology and Reanimation, Kahramanmaraş Sütçü İmam University Faculty of Medicine, 46040 Kahramanmaraş, Türkiye
[2] Department of Anesthesiology and Reanimation, Akdeniz University Faculty of Medicine, 07070 Antalya, Türkiye
* Correspondence: dregunduz@hotmail.com

Highlights

What are the main findings?

- Combining point-of-view (POV) video and mental practice significantly enhances neonatal laryngeal mask airway (LMA) training.
- Novice healthcare professionals trained with this hybrid model achieved superior objective procedural performance (OSCE scores).

What are the implications of the main findings?

- The intervention meaningfully reduced the perceived effort and cognitive burden required for initial task execution.
- This brief, scalable, and cognitively grounded model offers a pragmatic adjunct for Neonatal Resuscitation Program (NRP) curricula.

Abstract

Background/Objectives: Learning supraglottic airway device (SAD)/laryngeal mask airway (LMA) insertion during neonatal resuscitation presents unique educational challenges for novice healthcare professionals. This randomized simulation study aimed to compare the effects of combined point-of-view (POV) video and mental practice (MP) training versus standard instructor demonstration on OSCE performance, procedural time, and cognitive load in neonatal LMA insertion training. Methods: A total of 52 healthcare professionals with no prior neonatal LMA experience were randomized into two groups: Group A (Standard Demonstration, n = 26) and Group B (POV Video + Mental Practice, n = 26). Interventions were performed on a high-fidelity term neonatal simulator. Primary outcome measures were the total OSCE score and procedural time; secondary outcome measures included the NASA-TLX cognitive load questionnaire, first-attempt success, and critical error rates. Results: In terms of performance, Group B outperformed Group A by demonstrating substantially superior total OSCE scores (19.77 ± 1.58 vs. 16.19 ± 2.08; 95% CI for difference: 2.55 to 4.61; $p < 0.001$, r = 0.719) alongside a faster procedural completion time (22.38 ± 6.01 s vs. 26.88 ± 8.16 s; 95% CI for difference: −8.50 to −0.50; $p = 0.043$, r = 0.280). When looking at subjective workload via the NASA-TLX tool, Group B reported a meaningfully lower demand on the effort subscale ($p = 0.038$). Further evaluation via correlation tests indicated that higher perceived workloads were directly tied to prolonged procedural durations (rho = 0.289, $p = 0.038$) and lower OSCE outcomes (rho = −0.289, $p = 0.038$).

Check for updates

Academic Editor: Lukas P. Mileder

Received: 15 September 2026
Revised: 13 October 2026
Accepted: 24 October 2026
Published: 27 October 2026

Copyright: © 2026 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license.

Conclusions: The combination of POV video and mental practice in neonatal LMA training increases procedural success compared to standard demonstration and significantly reduces the perceived effort required for the procedure. This brief, cost-effective, and scalable cognitive-motor learning model is a pragmatic and robust alternative for integration into NRP simulation curricula. Trial registration: ClinicalTrials.gov, NCT07678424. Registered 01 July 2026—Retrospectively registered (Retrospectively registered due to administrative delays, with no deviations from the original protocol).

Keywords: neonatal resuscitation; laryngeal mask airway; mental practice; point-of-view (POV) video; cognitive load; NASA-TLX; simulation; OSCE

1. Introduction

About 10% of neonates need some degree of help to start breathing, while about 5% need ventilation. Because optimal airway control is the primary determinant of survival in these scenarios [1], the American Academy of Pediatrics (AAP) and American Heart Association (AHA) collaboratively developed the Neonatal Resuscitation Program (NRP) to offer a universal, evidence-based clinical framework [2]. The recommendation regarding the use of the LMA has been updated in the latest AHA guidelines: 'It may be reasonable to use a laryngeal mask as the primary interface to administer ventilation instead of a face mask for newborn infants 34 + 0/7 weeks' or more gestational age' [2].

Despite these recommendations, routine LMA utilization in neonatal resuscitation remains limited. Identified barriers include restricted procedural training, unfamiliarity with device sizing for the neonatal population, and a habitual preference for endotracheal intubation [1,3]. Two recent surveys showed that LMA use is limited among American and European healthcare providers involved in neonatal care at birth and explored the reasons for this limited use [4,5]. This situation is further complicated considering that neonatal resuscitation is frequently performed by healthcare professionals from various disciplines—such as midwives, nurses, paramedics, and emergency medical technicians (EMTs)—many of whom have not received formal airway management training [6]. Schmölzer et al. systematically reviewed the use of supraglottic airway devices in neonatal resuscitation and concluded that although the LMA provides reliable ventilation, there is insufficient evidence regarding optimal educational strategies for its dissemination among non-physician providers [7,8].

Simulation-based medical education (SBME) has become fundamental in procedural skill acquisition in high-stakes environments such as neonatal resuscitation. In a meta-analysis by McGaghie et al., SBME incorporating deliberate practice yielded significantly superior results compared to traditional clinical education, demonstrating a pooled effect size correlation of 0.71 across comparative effectiveness studies evaluating simulation-based interventions [9]. Within SBME, two complementary cognitive-motor learning strategies are garnering increasing academic interest: point-of-view (POV) video training and mental practice (MP).

POV video training utilizes wearable camera technology to present procedural steps from a first-person perspective, allowing learners to observe hand-eye coordination, instrument manipulation, and spatial orientation exactly as experienced by the operator. This approach directly addresses a fundamental limitation of third-person observation in traditional training, namely the inability to perceive the visual field and fine motor cues that guide procedural decision-making [10]. Thomson et al. demonstrated that POV footage provides a scalable, resource-efficient training experience for large cohorts of students [10]; meanwhile, Kwon reported that wearable action camera-based clinical skills training is a

feasible and well-accepted method among medical students [11]. Recently, a prospective RCT on ultrasound-guided central venous catheterization training found that the POV group achieved higher global assessment scores compared to face-to-face profile-view video and control groups, suggesting that an immersive first-person perspective is more beneficial for procedural skill acquisition [12].

Mental Practice—the cognitive rehearsal of a physical task in the absence of overt movement—has a strong theoretical foundation rooted in functional equivalence theory, which posits that imagined and executed actions share common neuromotor representations [13]. In surgical and procedural medical education, MP has been shown to enhance technical performance across various procedures ranging from laparoscopic surgery to mastoidectomy [14,15]. Arora et al. conducted a randomized controlled study demonstrating that a brief period of MP significantly improved laparoscopic performance in novice surgeons on a virtual reality platform, positing that the cognitive component of procedural rehearsal meaningfully accelerates motor skill encoding [14].

Cognitive load is an essential but frequently overlooked contributor to procedural skill development. The NASA Task Load Index (NASA TLX) is the most well-validated multidimensional scale to measure perceived workload across six dimensions: mental demand, physical demand, time demand, standard of performance, level of effort, and level of frustration [16]. In research simulating procedures, higher NASA TLX scores have consistently been linked to longer procedure completion time and greater error rate, highlighting the importance of assessing workload as part of educational intervention design [17].

Despite the critical need to improve neonatal LMA training for non-physician providers, there is currently no randomized study evaluating the combined approach of POV video and MP in the context of the NRP. The present study was designed to address this gap. We hypothesized that POV video training combined with MP for neonatal LMA insertion in novice healthcare professionals (including both non-physicians and physicians) would yield superior OSCE performance, shorter procedural times, and lower cognitive load compared to standard instructor demonstration.

2. Materials and Methods

This prospective, single-blind, randomized controlled simulation study was conducted using a replacement educational intervention design during NRP (Neonatal Resuscitation Program) courses (N = 2) held in Kahramanmaraş. The reporting of this study follows the Consolidated Standards of Reporting Trials (CONSORT) 2025 guidelines for randomized controlled trials. The trial was retrospectively registered at ClinicalTrials.gov (Identifier: NCT07678424). The trial was retrospectively registered due to administrative delays between ethical approval and clinical registry synchronization; however, no outcome switching or methodological changes occurred post-commencement. The study protocol was approved by the Kahramanmaraş Sütçü İmam University Medical Research Ethics Committee (Decision No: 18), and all scientific processes commenced following this approval. Written informed consent was obtained from all participants prior to implementation. The study was conducted in accordance with the principles of the Declaration of Helsinki. Participant recruitment and data collection were conducted between June 2026 and July 2026. The participant flow through the study is detailed in the CONSORT diagram (Figure 1).

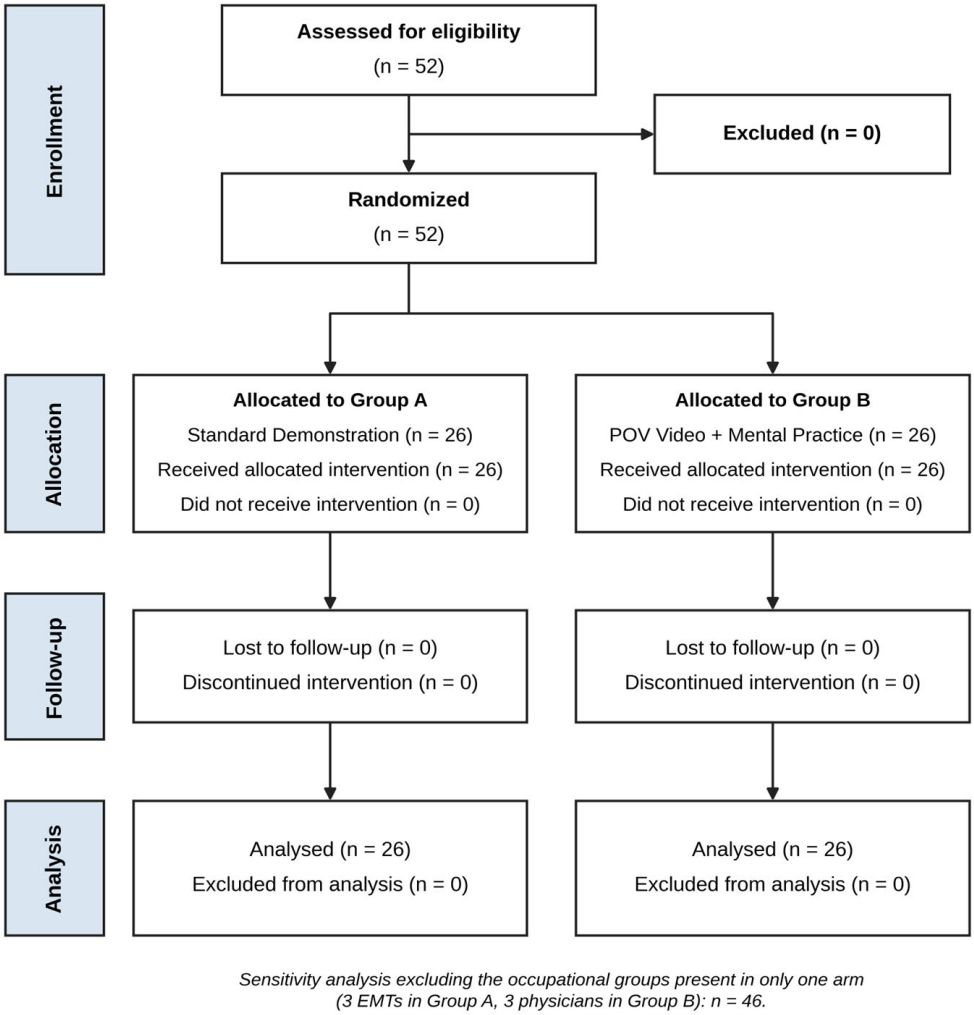


Figure 1. CONSORT flow diagram showing participant enrollment, randomization, allocation, follow-up, and analysis. Group A: Standard Demonstration (control); Group B: POV Video + Mental Practice (intervention). POV: point-of-view; EMT: emergency medical technician.

Participants consisted of physicians, midwives, nurses, paramedics, and emergency medical technicians (EMTs) who had no prior experience with neonatal LMA insertion on either real patients or manikin simulators, and who did not hold an NRP provider certificate. To isolate the pedagogical effect of the interventions, participants were required to be completely naive to neonatal supraglottic airway placement (having zero lifetime experience on neonates or manikins). Furthermore, individuals who had participated in any airway simulation training within the previous 6 months were excluded to minimize recent exposure bias. No participants were excluded due to incomplete data, and all 52 enrolled participants completed the study.

Sample size estimation was performed using G*Power 3.1.9.7 (Heinrich-Heine-Universität, Düsseldorf, Germany). According to an independent-groups comparative study with an expected population effect size (Cohen's d) of 0.80, with two-tailed $\alpha = 0.05$ and a power level of 0.80, a total sample size of 52 participants (or 26 participants per group) is necessary in order to achieve sufficient power for statistical analysis. As such, there were 52 participants enrolled in the study (26 subjects in Group A and 26 subjects in Group B) as described above. The subjects were randomly assigned to their respective groups using a block randomization technique with four subject blocks, based upon a computer-generated random number sequence prepared by an investigator who was independent of delivering

the training or assessing the outcome. The allocation sequence was concealed in sequentially numbered, opaque, sealed envelopes until the interventions were assigned.

Group A—Standard Demonstration (Control): The same experienced, NRP-certified instructor (who had previous clinical experience with LMA placement in both manikins and real neonates) performed a standardized, step-by-step demonstration of neonatal LMA insertion on a mid-fidelity term neonatal simulator (Newborn Anne, Laerdal Medical, Stavanger, Norway). Verification of ventilation was objectively assessed by visually observing the standardized chest rise. The demonstration adhered to current NRP guidelines and covered all procedural steps: selecting the appropriate device size for a term neonate (size 1 classic cuffed laryngeal mask airway [LMA Classic™, Teleflex Medical, Athlone, Ireland]), device testing via cuff inflation, cuff deflation and lubrication, correct head positioning, device advancement along the hard palate, cuff inflation, verification of ventilation, and a leak check. The demonstration lasted approximately five minutes and was conducted as a passive observational session using a standardized oral script explaining the procedural steps, without interactive Q&A. No instructional video material was provided.

Group B—POV Video + Mental Practice (Intervention): Participants in this group did not receive a live instructor demonstration. Instead, they viewed a 1.5 min standardized POV video captured by a neck-mounted action camera (e.g., GoPro Hero 10 Black GoPro Inc., San Mateo, CA, USA, set to a narrow linear lens) worn by an experienced NRP-certified instructor. The video displayed the entire LMA insertion procedure from the instructor's first-person visual perspective, accompanied by synchronous expert voiceover narration describing each step and key tactile cues. Immediately after viewing the video, participants were instructed to close their eyes and perform a one-minute self-directed mental rehearsal, relying solely on their cognitive recall of the video without the use of an external audio script or guided imagery.

To ensure rigorous single-blinding, both educational interventions (the live demonstration for Group A, and the video viewing along with the subsequent 1 min mental rehearsal for Group B) were conducted in a separate training room isolated from the evaluation area. The participants then entered the evaluation room individually to attempt the neonatal LMA insertion procedure on the manikin. Participants did not receive any opportunity for physical practice on the manikin prior to the assessment. The performance measured represents the participants' first attempt at the procedure. The same trained evaluator remained strictly in the evaluation room, completely blinded to the participants' group assignments, and recorded the outcome data solely during the physical performance phase. To prevent unblinding, participants were strictly instructed not to discuss their training allocation or method with the evaluator upon entering the evaluation room.

Two crucial outcome measures were included in the assessment: (1) a total score for each OSCE; this number was obtained based on the use of an evidence-based standardized checklist of procedures consisting of 11 items (maximum score of 22 points), determined by expert opinion and adapted from currently accepted publications. The 11-item OSCE checklist assessed procedural domains including device preparation, cuff deflation, head positioning, insertion technique along the hard palate, depth confirmation, cuff reinflation, and verification of bilateral chest rise (provided in Supplementary Table S1). (2) Procedural time as measured by timing in seconds from when the first touch was made to the LMA device to when ventilation was confirmed in the manikin.

The secondary endpoints for the study were (1) first-attempt success classified as binary (yes/no); (2) critical error rate, defined as deviation(s) from established procedures that would create the potential for a clinical risk (e.g., failure to check if the cuff was deflated, direction of insertion was incorrect); (3) excessive force application while inserting (measured via sensor feedback from the manikin and instructor observation), (4) airway

trauma or a failed procedure; and (5) NASA-TLX score of cognitive load. The Raw TLX version was administered following the procedure, which does not include the pairwise comparison of pairs for weighting purposes. A total of 6 sub-tests are scored using a 1–10 scale and range from a total score of 6 to 60 [17].

Data were analyzed using IBM SPSS Statistics 22 (IBM Corp., Armonk, NY, USA). The normality of continuous variables was assessed with the Shapiro–Wilk test. Since the majority of variables violated the assumption of normality ($p < 0.05$), non-parametric tests were used throughout the analyses. Intergroup comparisons of continuous variables were performed using the Mann–Whitney U test; results are presented as mean ± standard deviation (Mean ± SD) and median with interquartile range [Median, IQR: Q25–Q75]. Categorical variables were compared using Fisher's Exact Chi-Square Test, expressed as frequencies and percentages, and odds ratios (OR) were reported where applicable. Relationships between pairs of continuous variables were evaluated with Spearman's rho correlation coefficient. Effect size (r) for the Mann–Whitney U test was calculated as $r = |Z|/\sqrt{N}$; $r < 0.3$ was considered a small effect, $0.3 \leq r < 0.5$ a medium effect, and $r \geq 0.5$ a large effect [18]. The level of statistical significance was set at $p < 0.05$.

3. Results

All 52 enrolled participants successfully completed the study protocols, with 26 individuals in each group. The cohort featured a diverse professional makeup, including 14 midwives in Group A and 9 in Group B, 6 versus 10 nurses, 3 versus 4 paramedics, 3 emergency medical technicians (all in Group A), and 3 physicians (all in Group B). Prior experience with neonatal LMA insertion was completely absent across the entire sample.

Group B demonstrated clear superiority in procedural performance, achieving a significantly higher median total OSCE score compared to Group A (20.0 [IQR 19.0–21.0] vs. 17.0 [IQR 15.0–17.0]; $p < 0.001$). Furthermore, Group B executed the procedure at a significantly faster pace, yielding a lower median procedural time (22.0 [IQR 19.0–25.8] s vs. 25.0 [IQR 21.2–30.0] s; $p = 0.043$), presenting a small-to-medium effect size. These data are summarized in Table 1.

Table 1. Comparison of Continuous Variables Between Groups (n = 26/group).

Variable	Group A Mean ± SD	Group A Median [IQR]	Group B Mean ± SD	Group B Median [IQR]	U	*p*	r
Procedural Time (s)	26.88 ± 8.16	25.0 [21.2–30.0]	22.38 ± 6.01	22.0 [19.0–25.8]	448.5	0.043 *	0.280
Total OSCE Score	16.19 ± 2.08	17.0 [15.0–17.0]	19.77 ± 1.58	20.0 [19.0–21.0]	57.0	<0.001 ***	0.719
NASA-TLX Total	22.96 ± 11.14	23.0 [12.8–30.5]	18.69 ± 9.17	22.0 [11.0–25.2]	420.0	0.135	0.207
Mental Demand	3.92 ± 2.42	5.0 [2.0–5.0]	3.81 ± 2.68	3.0 [1.2–5.8]	355.5	0.752	0.044
Physical Demand	3.54 ± 2.39	3.0 [2.0–5.0]	2.50 ± 1.24	2.5 [1.2–3.0]	411.5	0.172	0.189
Temporal Demand	3.62 ± 1.98	3.0 [2.0–5.0]	3.15 ± 2.05	3.0 [1.2–4.0]	393.0	0.311	0.141
Performance	3.88 ± 2.37	3.0 [2.0–5.0]	2.65 ± 1.32	3.0 [1.2–4.0]	433.0	0.079	0.244
Effort	4.31 ± 2.74	3.0 [2.0–7.0]	2.65 ± 1.50	2.5 [1.0–4.0]	450.0	0.038 *	0.287
Frustration	3.69 ± 2.59	3.0 [1.2–5.0]	3.92 ± 2.43	4.0 [2.0–5.8]	311.5	0.630	0.067

Group A: Standard Demonstration (Control); Group B: Mental Practice + POV Video (Intervention). IQR: Interquartile Range (Q25–Q75). Mann–Whitney U test. r = effect size ($r = |Z|/\sqrt{N}$); small: $r < 0.3$, medium: $0.3 \leq r < 0.5$, large: $r \geq 0.5$. * $p < 0.05$; *** $p < 0.001$. Non-significant comparisons are presented without asterisks.

Due to a baseline occupational imbalance resulting from random allocation (all 3 physicians in Group B, all 3 EMTs in Group A), a sensitivity analysis was conducted excluding these 6 participants (remaining n = 46). The analysis confirmed that the highly significant difference in total OSCE scores robustly persisted (19.91 ± 1.56 vs. 16.17 ± 2.12; $p < 0.001$, r = 0.731), indicating that the primary outcome of procedural competence was not confounded by professional background. However, the difference in procedural time lost statistical significance (23.00 ± 6.07 s vs. 26.70 ± 8.02 s; $p = 0.120$, r = 0.229). This suggests that the initial temporal advantage was either sensitive to the reduced statistical power (Type II error) or partially influenced by the baseline occupational variance.

The first-attempt success rate (92.3% vs. 80.8%) in Group B was higher than that in Group A, but was not statistically significantly different from one another ($p = 0.419$). The critical error rate in Group A (23.1%) was higher than in Group B (7.7%), but no statistically significant difference was found between both groups (OR = 3.60; $p = 0.248$). The use of excessive force was noted in one subject from Group A but there were no excessive force events in subjects from Group B. This difference was also not statistically significant ($p = 1.000$). Five participants in Group A (19.2%) and 2 participants in Group B (7.7%) experienced trauma or procedural failure. However, this difference was not statistically significant either (OR = 2.86; $p = 0.419$). While neither of these comparisons achieved statistical significance, all observed trends favored Group B. These findings are detailed in Table 2.

Table 2. Distribution of Categorical Outcome Variables by Group (Fisher's Exact Chi-Square Test).

Variable	Group A Yes n (%)	Group A No n (%)	Group B Yes n (%)	Group B No n (%)	OR	*p* (Fisher)
First-attempt success	21 (80.8%)	5 (19.2%)	24 (92.3%)	2 (7.7%)	0.35	0.419
Critical error	6 (23.1%)	20 (76.9%)	2 (7.7%)	24 (92.3%)	3.60	0.248
Excessive force	1 (3.8%)	25 (96.2%)	0 (0.0%)	26 (100%)	—	1.000
Trauma/failure	5 (19.2%)	21 (80.8%)	2 (7.7%)	24 (92.3%)	2.86	0.419

Group A: Standard Demonstration (Control); Group B: Mental Practice + POV Video (Intervention). OR: Odds Ratio (with Group A/Group B as reference). All *p* values > 0.05.

Statistical evaluation of the global NASA-TLX scores yielded no significant variance between the two arms (Group A: 22.96 ± 11.14 vs. Group B: 18.69 ± 9.17; $p = 0.135$). Among the evaluated dimensions, statistical significance was restricted to the effort subscale, which was substantially lower within the Group B cohort (Mean ± SD: 2.65 ± 1.50 vs. 4.31 ± 2.74; U = 450.0, $p = 0.038$, r = 0.287). Intergroup differences failed to reach significance for the remaining metrics, including performance, frustration, and mental, physical, or temporal demands (all $p > 0.05$).

Spearman correlation metrics (Table 3) demonstrated that global workload perceptions shared a positive relationship with procedural time (rho = 0.289, $p = 0.038$) and an inverse relationship with total OSCE scores (rho = −0.289, $p = 0.038$). Consequently, heightened cognitive strain appears coupled with prolonged execution and reduced procedural competence. Additionally, the mental demand domain maintained a moderate positive correlation with procedural duration (rho = 0.352, $p = 0.010$), while the performance subscale correlated moderately and negatively with objective OSCE scores (rho = −0.324, $p = 0.019$). No significant correlation emerged between procedural time and total OSCE marks (rho = −0.200, $p = 0.156$).

Table 3. Spearman Correlation Analysis Results (N = 52).

Variable Pair	rho	*p*	n	Correlation Strength
NASA-TLX Total—Procedural Time (s)	0.289	0.038 *	52	Weak (+)
NASA-TLX Total—OSCE Total Score	−0.289	0.038 *	52	Weak (−)
Procedural Time (s)—OSCE Total Score	−0.200	0.156	52	—
Mental Demand—Procedural Time (s)	0.352	0.010 *	52	Moderate (+)
Performance—OSCE Total Score	−0.324	0.019 *	52	Moderate (−)

rho: Spearman rank correlation coefficient. (+): positive direction; (−): negative direction. |rho| < 0.3: weak; 0.3–0.5: moderate; >0.5: strong. * $p < 0.05$.

4. Discussion

To the best of our knowledge, this randomized simulation study is the first to evaluate the combined effect of POV video and mental practice training versus standard instructor demonstration for neonatal LMA insertion in novice healthcare professionals. The primary finding of our study is the improvement in procedural performance outcomes following the POV video-MP intervention. The high OSCE scores and shortened procedural times observed in the intervention group clearly demonstrate the synergistic effect of these two modalities. These findings suggest that a brief, cognitively grounded training model can support initial procedural skill acquisition in healthcare professionals with no prior neonatal LMA experience.

The higher OSCE scores observed in the intervention group (19.77 vs. 16.19) align with previous literature demonstrating the efficacy of video-based training modalities. In airway management education, video-assisted strategies have frequently been reported to enhance technical performance compared to traditional instructional methods. In neonatal airway management, visual cues are highly constrained by the small oral cavity and precise anatomical landmarks. The first-person perspective provided by POV video captures the exact operator visual field, hand-finger orientation, and the correct insertion trajectory along the hard palate that are inherently obscured during third-person side observation. This egocentric spatial alignment enhances mirror neuron activation and facilitates accurate mental schema formation. The motor simulation theory underlying this advantage explains the process very clearly: observing an action directly from the practitioner's own perspective (spatial frame of reference) activates mirror neurons much more comprehensively and, unlike third-person observation, enriches the mental representation of the movement, allowing for a much stronger transfer to practice [13].

The approximately 4.5 s (~17%) reduction in procedural time observed in Group B is in complete alignment with motor learning principles [19]. It is established that mental practice (MP) provides the practitioner with the opportunity to formulate a procedural schema in their mind well before making physical contact with the device; thereby, the cognitive search (pausing and thinking) process experienced by novices during live performance is significantly alleviated [13,14,19]. In a context like neonatal resuscitation, where every second lost in ventilation is critical, even small reductions in procedural time may be advantageous. However, while statistically significant, the clinical relevance of a 4.5 s difference in a simulated setting remains open to interpretation, and whether such time savings translate directly into meaningful clinical outcomes warrants cautious evaluation. This 'accelerating' effect of mental practice has been clearly demonstrated not only in our study but also in similar research within surgical education literature. Arora et al. showed that novice surgeons who underwent structured MP prior to laparoscopic training in a virtual reality environment not only achieved higher quality scores but also completed the

procedure much faster [14]. Similarly, Conlin et al. reported that MP significantly enhanced both procedural speed and execution accuracy in residents receiving mastoidectomy training [15]. However, it is crucial to acknowledge that our sensitivity analysis revealed this temporal advantage lost statistical significance when adjusted for baseline occupational imbalances. Therefore, while MP theoretically accelerates motor execution by pre-forming cognitive schemas, in our specific cohort, procedural speed may have been partially influenced by the generalized clinical experience of the physicians incidentally clustered in the intervention arm. Future studies with larger, occupationally stratified samples are required to definitively isolate the true effect of POV-MP training on procedural time.

Regarding cognitive workload, total NASA-TLX scores did not differ significantly between the groups ($p = 0.135$). However, participants in Group B reported a significantly lower demand on the effort subscale ($p = 0.038$), suggesting that pre-procedural mental rehearsal combined with first-person perspective demonstration may facilitate initial task execution with less perceived exertion [16,17]. Additionally, correlational analyses indicated that overall perceived workload correlated positively with procedural duration (rho = 0.289, $p = 0.038$) and inversely with objective OSCE performance (rho = −0.289, $p = 0.038$). These observations are consistent with prior simulation literature demonstrating that procedural proficiency is closely coupled with cognitive load management [16,17].

Although none of our categorical outcomes reached statistically significant levels, all clinical evidence trends supported group B for all outcome measures: higher (first-attempt) success rates (92.3% to 80.8%), reduced critical error (7.7% to 23.1%) and/or trauma/failure (7.7% to 19.2%) rates indicate a significant clinical benefit for group B that likely will be statistically verified with larger powered studies. The first-attempt success rates in our study (92.3% and 80.8%) appear relatively low compared to studies involving experienced providers, such as the midwife cohort in Uganda reported by Pejovic et al. [20], which likely reflects the completely naive nature of our participant pool. Additionally, the risk for critical error was 3.60 times higher in the control group (OR = 3.60) than in the group receiving training; as such, these findings warrant significant emphasis from the perspective of patient safety as a critical error during any phase of neonatal airway management can directly affect the success of ventilation.

From a practical educational standpoint, POV video and MP present a meaningful opportunity for scalability and standardization. Unlike live demonstrations, these contents can be delivered to large cohorts without increasing the demand on faculty resources; meanwhile, MP adds zero-cost depth to the process via cognitive activity. Integrating these methods into NRP preparatory phases will elevate the quality of face-to-face simulations by increasing baseline competency prior to execution. This paradigm aligns perfectly with the current literature advocating for 'flipped-classroom' models in medical education, where theoretical preparation is completed before practical application, proving that this model enhances student achievement [21].

Certain limitations must be acknowledged when evaluating our study. First, the use of a completely naive cohort, while necessary to isolate the intervention's effect, does not reflect the typical target population for this training, who often have prior bag-mask or intubation experience; this limits the generalizability of our findings. Second, this study evaluated the acquisition of an isolated skill; it remains unclear how these learning methods would influence skill acquisition within a comprehensive educational program incorporating multiple, complex clinical scenarios. Third, we assessed only the initial attempt; achieving true mastery of a motor skill generally requires repeated practice sessions. Fourth, this study utilized a single LMA model (cuffed LMA); the results, particularly regarding insertion time and success rates, may differ if other types of supraglottic airways (e.g., uncuffed or newer generation devices) are used. Fifth, our study's sample size was calculated based on

continuous variables (procedural time and OSCE score). Therefore, the absence of statistical significance in categorical data, such as first-attempt success or critical errors, should not be interpreted as the two methods being clinically 'equivalent', as our statistical power for these parameters is relatively limited. Sixth, the single-center design of our research may restrict the generalizability of our findings to different institutional cultures and healthcare systems. An unintended professional skew during random allocation also warrants caution; though every participant was completely new to the procedure, having all physicians in the intervention arm and all emergency medical technicians in the control cohort might introduce a subtle baseline variance in learning curves. Seventh, procedural performance was assessed solely at a single time point immediately following training; consequently, long-term skill retention could not be evaluated. Since long-term skill retention is a core objective of NRP training, this issue should be the focus of future studies. Additionally, because our intervention combined both POV video observation and mental rehearsal, the relative standalone contribution of each instructional component cannot be definitively isolated. A three-arm design incorporating mental practice following standard demonstration would be required to delineate the independent effect of first-person video modeling. Finally, participant satisfaction regarding the educational model was not formally evaluated using a structured instrument; however, the current literature indicates that POV-based training is highly embraced by healthcare professionals [10,11].

5. Conclusions

In conclusion, combining point-of-view (POV) video modeling with mental practice significantly enhances immediate procedural competence in neonatal LMA insertion among novice healthcare professionals compared to standard instructor demonstration, while reducing perceived effort. This brief and scalable instructional model offers a practical adjunct for neonatal resuscitation training curricula. Future multicenter investigations should evaluate long-term skill retention and its transfer to clinical neonatal resuscitation.

Supplementary Materials: The following supporting information can be downloaded at: https://www.mdpi.com/article/10.3390/children13111479/s1, Table S1: Objective Structured Clinical Examination (OSCE) Checklist for Neonatal Laryngeal Mask Airway Insertion.

Author Contributions: Conceptualization, C.Y., E.G. and G.Ö.; methodology, C.Y. and G.Ö.; validation, C.Y., E.G. and G.Ö.; formal analysis, C.Y.; investigation, C.Y. and G.Ö.; resources, G.Ö.; data curation, C.Y.; writing—original draft preparation, C.Y.; writing—review and editing, E.G. and G.Ö.; supervision, E.G. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Medical Research Ethics Committee of Kahramanmaraş Sütçü İmam University (Decision No: 18, 15 June 2026). Trial Registration: The study protocol was retrospectively registered at ClinicalTrials.gov on 1 July 2026 (Identifier: NCT07678424, URL: https://clinicaltrials.gov/study/NCT07678424 (accessed on 15 September 2026)).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request, because of patient privacy regulations.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Liley, H.G.; Weiner, G.M.; Wyckoff, M.H.; Rabi, Y.; Schmölzer, G.M.; de Almeida, M.F.; Neonatal Life Support Task Force Collaborators. Neonatal Life Support: 2025 International Liaison Committee on Resuscitation Consensus on Science with Treatment Recommendations. *Circulation* **2025**, *152*, S165–S204. [CrossRef]
2. Lee, H.C.; Strand, M.L.; Finan, E.; Illuzzi, J.; Kamath-Rayne, B.D.; Kapadia, V.; Mahgoub, M.; Niermeyer, S.; Schexnayder, S.M.; Schmölzer, G.M.; et al. Part 5: Neonatal Resuscitation: 2025 American Heart Association and American Academy of Pediatrics Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care. *Circulation* **2025**, *152*, S385–S423. [CrossRef]
3. Yamada, N.K.; McKinlay, C.J.; Quek, B.H.; Schmölzer, G.M.; Wyckoff, M.H.; Liley, H.G.; Rabi, Y.; Weiner, G.M. Supraglottic airways compared with face masks for neonatal resuscitation: A systematic review. *Pediatrics* **2022**, *150*, e2022056568. [CrossRef]
4. Foglia, E.E.; Shah, B.A.; DeShea, L.; Lander, K.; Kamath-Rayne, B.D.; Herrick, H.M.; Zaichkin, J.; Lee, S.; Bonafide, C.; Song, C.; et al. Laryngeal mask use during neonatal resuscitation at birth: A United States-based survey of neonatal resuscitation program providers and instructors. *Resusc. Plus* **2024**, *17*, 100515. [CrossRef]
5. Trevisanuto, D.; Gizzi, C.; Cavallin, F.; Beke, A.; Buonocore, G.; Charitou, A.; Cucerea, M.; Filipović-Grčić, B.; Jekova, N.G.; Koç, E.; et al. Laryngeal Mask Airway in Neonatal Resuscitation: A Survey of the Union of European Neonatal and Perinatal Societies. *Neonatology* **2024**, *121*, 780–789. [CrossRef]
6. Thomas, E.J.; Taggart, B.; Crandell, S.; Lasky, R.E.; Williams, A.L.; Love, L.J.; Sexton, J.B.; Tyson, J.E.; Helmreich, R.L. Teaching teamwork during the Neonatal Resuscitation Program: A randomized trial. *J. Perinatol.* **2007**, *27*, 409–414. [CrossRef]
7. Bansal, S.C.; Caoci, S.; Dempsey, E.; Trevisanuto, D.; Roehr, C.C. The Laryngeal Mask Airway and Its Use in Neonatal Resuscitation: A Critical Review of Where We Are in 2017/2018. *Neonatology* **2018**, *113*, 152–161. [CrossRef]
8. Schmölzer, G.M.; Agarwal, M.; Kamlin, C.O.; Davis, P.G. Supraglottic airway devices during neonatal resuscitation: An historical perspective, systematic review and meta-analysis of available clinical trials. *Resuscitation* **2013**, *84*, 722–730. [CrossRef]
9. McGaghie, W.C.; Issenberg, S.B.; Cohen, E.R.; Barsuk, J.H.; Wayne, D.B. Does simulation-based medical education with deliberate practice yield better results than traditional clinical education? A meta-analytic comparative review of the evidence. *Acad. Med.* **2011**, *86*, 706–711. [CrossRef]
10. Thomson, F.C.; Morrison, I.; Watson, W.A. 'Going Professional': Using point-of-view filming to facilitate preparation for practice in final year medical students. *BMJ Simul. Technol. Enhanc. Learn.* **2018**, *4*, 148–149. [CrossRef]
11. Kwon, O.Y. Online clinical skills education using a wearable action camera for medical students. *J. Exerc. Rehabil.* **2022**, *18*, 356–360. [CrossRef]
12. Liao, P.-H.; Chen, C.-T.; Lee, Y.-T.; Lee, C.-H.; How, C.-K.; Huang, H.-H.; Hsu, T.-F. Educational benefits of pre-class videos and viewing perspectives on ultrasound-guided central venous catheterization training: A prospective randomized controlled trial. *BMC Med. Educ.* **2026**, *26*, 551. [CrossRef]
13. Driskell, J.E.; Copper, C.; Moran, A. Does mental practice enhance performance? *J. Appl. Psychol.* **1994**, *79*, 481–492. [CrossRef]
14. Arora, S.; Aggarwal, R.; Sirimanna, P.; Moran, A.; Grantcharov, T.; Kneebone, R.; Sevdalis, N.; Darzi, A. Mental practice enhances surgical technical skills: A randomized controlled study. *Ann. Surg.* **2011**, *253*, 265–270.
15. Conlin, A.; Lea, J.; Bance, M.; Chadha, N.; Kilty, S.; Kozak, F.; Savage, J.; Sidhu, R.; Chen, J.; Westerberg, B.D. Mental practice in postgraduate training: A randomized controlled trial in mastoidectomy skills. *J. Otolaryngol. Head Neck Surg.* **2016**, *45*, 46. [CrossRef]
16. Hart, S.G.; Staveland, L.E. Development of NASA-TLX (Task Load Index): Results of empirical and theoretical research. In *Human Mental Workload*; Hancock, P.A., Meshkati, N., Eds.; North-Holland: Amsterdam, The Netherlands, 1988; pp. 139–183.
17. Yurko, Y.Y.; Scerbo, M.W.; Prabhu, A.S.; Acker, C.E.; Stefanidis, D. Higher mental workload is associated with poorer laparoscopic performance as measured by the NASA-TLX tool. *Simul. Healthc.* **2010**, *5*, 267–271. [CrossRef]
18. Cohen, J. *Statistical Power Analysis for the Behavioral Sciences*, 2nd ed.; Lawrence Erlbaum Associates: Hillsdale, NJ, USA, 1988.
19. Schmidt, R.A.; Lee, T.D. *Motor Learning and Performance: From Principles to Application*, 5th ed.; Human Kinetics: Champaign, IL, USA, 2014.
20. Pejovic, N.J.; Trevisanuto, D.; Lubulwa, C.; Myrnerts Höök, S.; Cavallin, F.; Byamugisha, J.; Nankunda, J.; Tylleskär, T. Laryngeal mask airway for resuscitation of neonates: A randomized controlled trial in a low-resource setting (NeoSupra trial). *Acta Paediatr.* **2018**, *107*, 1777–1784.
21. Hew, K.F.; Lo, C.K. Flipped classroom improves student learning in health professions education: A meta-analysis. *BMC Med. Educ.* **2018**, *18*, 38. [CrossRef]

Disclaimer/Publisher's Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.