Quest Journals
Journal of Research in Humanities and Social Science
Volume 11 ~ Issue 3 (2023) pp: 29-38
ISSN(Online):2321-9467
www.questjournals.org

Research Paper

Skills training for airway management in emergency medicine: a randomised controlled trial

Marc Wrobel[1], MD, Maike Wrobel[1], MD, Jennifer Steiner[1], MD, Darius Kubulus[1], MD, Hagen Bomberg[1], MD, Sven Schneider[1], MD

[1] *Department of Anaesthesiology, Intensive Care Medicine and Pain Medicine, Saarland University, Saarland University Medical Centre, Homburg/Saar, Germany*

Address for correspondence: Dr. med. H. Bomberg, MD
Dept. of Anaesthesiology, Intensive Care Medicine and Pain Medicine
Saarland University Medical Centre
Kirrbergerstrasse 1, 66421 Homburg/Saar, Germany

Abstract
Background: *Airway management is an important component of emergency medicine. Laryngeal tubes are easy to place by paramedics and yet the teaching strategy for the achievement of this skill could be improved.*
Methods: *In this randomised controlled trial, 100 students completing an internship for paramedics were randomised into four groups in order to learn laryngeal tube placement: Group 1 saw a video podcast (Video); Group 2 followed a 30-minute teacher-centred course (Lecture); Group 3 followed a Peyton's-four-step-approach (Peyton-4), and Group 4 followed a Peyton's-five-step-approach (Peyton-5). The groups were blinded and compared in ten tests of laryngeal tube placement for the evaluation of mean time and success rate. Odds ratios (OR and 95% confidence interval) were calculated and adjusted for potential confounder.*
Results: *The mean time of 10 laryngeal tube placements after the teaching course was significantly increased in Groups Video and Lecture compared with Peyton-4 and Peyton-5 (Video: 28.0±13.0 sec; Lecture: 27.3±12.5 sec; Peyton-4: 22.7±7.1 sec; Peyton-5: 21.7±7.4 sec; p<0.001). After adjustment for potential confounder, Peyton-4 (adjusted OR: 4.01, 95% CI 1.16 – 14.07, p=0.028) and Peyton-5 (adjusted OR: 7.73, 95% CI 2.12 – 28.36; p=0.002) remained an independent factor to decrease the mean time of laryngeal tube placement. There were no statistical differences in the success rates between the groups.*
Conclusion: *It seems plausible that the combination of theoretical knowledge and practical skills training in the Peyton's-five-step-approach leads to the fastest laryngeal tube placement.*
Key words: *Peyton's-four-step-approach, Peyton's-five-step-approach, laryngeal tube, students, teacher-centred course, video podcast*

Received 18 Feb., 2023; Revised 28 Feb., 2023; Accepted 02 Mar., 2023

What is already known on this subject
Laryngeal tubes are easy to place by paramedics. The achievement of this skill is essential. Previous studies have suggested that the combination of theoretical knowledge and practical skills training is the best approach. However, the comparison of video podcast, teacher-centred course, Peyton's-four-step-approach, and Peyton's-five-step-approach has never been documented in a study.

What this study adds
Our study suggests that the Peyton's-five-step-approach is superior to other teaching methods and leads to the fastest successful laryngeal tube placement compared with video podcast, teacher-centred course, and Peyton's-four-step-approach.

I. Introduction:

Competence in airway management for maintenance of oxygenation and ventilation represent fundamental skills in emergency medicine. Gold standard is still the endotracheal intubation by an emergency physician.[1-3] However, endotracheal intubation is associated with a high risk of failure and depends on the experience of the emergency physician and on the individual intubation conditions of the patient.[2, 4-7]

Supraglottic airway devices in various kinds are becoming popular and offer an alternative to endotracheal intubation, especially the successful use of laryngeal tubes for airway management.[2, 5, 8] Laryngeal tubes are easy to place by paramedics and show a higher hit ratio in successful airway management compared with endotracheal intubation.[2, 5, 8]

To perform an ongoing assessment of this learning objective, different teaching strategies may be effective. Other than the traditional teacher-centred course including theoretical instruction of the equipment or video podcast which depicts the laryngeal tube and procedural insertion,[9] a Peyton's-four-step-approach which is divided into four singular standardised parts can be utilised.[10]

1. Demonstration: The trainer demonstrates the steps at normal speed without commentary.
2. Deconstruction: The trainer demonstrates the steps while describing them.
3. Comprehension: The trainer demonstrates the steps while the learner describes them.
4. Performance: The learner demonstrates the steps in the course of describing them.

This stepwise approach gradually shifts the responsibility of performing the skills from the instructor to the learner. Bullock already stated in 2000 that "goal attainment should be changed behaviour with performance enhanced through regular practice".[1]

If Peyton's-four-step-approach includes an additional step with simulator training under supervision, this actually specifies the Peyton's-five-step-approach. It is still a matter of debate, which way of teaching shows the best results of insertion of laryngeal tubes for successful airway management.

In our prospective, randomised, controlled trial, we compared video podcast, teacher-centred-course, Peyton's-four-step-approach, and Peyton's-five-step-approach in teaching students to learn insertion of laryngeal tubes for successful airway management. To minimise potential bias, all included study participants hadn't any clinical experience.

II. Methods:

This study was conducted between January and April 2011 at the Saarland University Medical Centre in Homburg, Germany, and was designed as a randomised trial. Written informed consent was obtained from all test persons included in this study.

2.1 Participants:

All students graduated from secondary school without any practical knowledge about emergency medicine.

2.2 Interventions:

Group 1: All students saw a 30-minute homemade video podcast that included the theoretical instruction of the equipment, all key information about the laryngeal tube (LTS II, Size 4, VBM Medizintechnik GmbH, Sulz a.N. Germany), and procedural insertion of the laryngeal tube (Table 1).

Group 2: The same teacher as in the video taught all students in a 30-minute lesson. The teacher-centred course included the same information in the same structure as in the video (Table 1).

Group 3: The same teacher as in Groups 1 and 2 taught all students by using Peyton's-four-step-approach which includes the theoretical instruction of the equipment (same presentation as in Groups 1 and 2; Table 1) and four singular standardised parts:

1. Demonstration: The trainer demonstrates the steps at normal speed without commentary.
2. Deconstruction: The trainer demonstrates the steps while describing them. Demonstration and deconstruction were applied in the same manner as the teacher-centred course in Groups 1 and 2 (Table 1).
3. Comprehension: The trainer demonstrates the steps while the learner describes them.
4. Performance: The learner demonstrates the steps in the course of describing them.

Group 4: All students were taught by Peyton's-five-step-approach which includes the Peyton's-four-step-approach with the same teacher and an additional step with simulator training under supervision. The simulator training included laryngeal tube placement ten times on the advanced life support trainer (Ambu® M Mega Code W, Ambu GmbH, Bad Nauheim, Germany).

Each test person was tested for placement of the laryngeal tube (LTS II, Size 4, VBM Medizintechnik GmbH, Sulz a.N. Germany) by demonstration on an advanced life support trainer (Ambu® M Mega Code W, Ambu GmbH, Bad Nauheim, Germany). The demonstration included ten separately performed laryngeal tube placements. Each test of laryngeal tube placement included: mouth opening by using the cross handle, laryngeal

tube insertion to the point until the mark of the tooth matches the height of the incisor (upper jaw), blocking of the laryngeal tube, mechanical ventilation by using an Ambu breathing bag, and successfully moving both sides of the thorax.

The mean time is the mean time of the 10 tests. Success rate of laryngeal tube placement was successful mechanical ventilation by using an Ambu breathing bag and successfully moving both sides of the thorax.

2.3 Outcomes:

The primary outcome was the time of laryngeal tube placement depending on the teaching techniques. The secondary outcome was laryngeal tube placement success depending on the teaching techniques.

2.4 Sample size

During the study period between January and April 2011, 100 students underwent the course about laryngeal tube placement. These 100 students were randomised into four groups, each with 25 test persons. Exclusion criteria comprised of: no consent to the study or no attendance during the test of the laryngeal tube placement.

2.5 Randomisation:

The students were randomised by choosing a number from a sealed envelope from an assistant.

2.6 Blinding:

Each test person was blinded. The teacher was not the same as in the teaching lesson, saw the students during the tests for the first time, and didn't know in which group they had been allocated. There was one teacher for all tests. The demonstration included ten separately performed laryngeal tube placements. Each test of laryngeal tube placement included: mouth opening by using the cross handle, laryngeal tube insertion to the point until the mark of the tooth matches the height of the incisor (upper jaw), blocking of the laryngeal tube, mechanical ventilation by using an Ambu breathing bag, and successfully moving both sides of the thorax.
The mean time is the mean time of the 10 tests. Success rate of laryngeal tube placement was successful mechanical ventilation by using an Ambu breathing bag and successfully moving both sides of the thorax.

2.7 Statistics:

Our primary analysis was a chi square comparison of frequencies between the groups. For continuous variables, groups were compared by one-way ANOVA, followed by post-hoc analysis including the correction of α error according to Bonferroni. For non-normal distributed variables, ANOVA for nonparametric values (Kruskal Wallis test) was used with multiple comparison method (Dunn or Bonferroni method). Logistic regression analysis was used to calculate univariate and multivariate odds ratios (OR) with 95% confidence intervals (CI). Calculation of all OR and all comparisons were made with respect to probands taught by media-supported podcast. Potential confounder was A-level. Goodness of fit was assessed by Hosmer-Lemeshow-tests. Data analysis was performed using IBM SPSS Statistics for Windows, version 19 (IBM Corp., Armonk, N.Y., USA). Continuous variables were expressed as mean and standard deviation (SD). Categorical variables are presented as absolute and relative frequencies, respectively. Statistical significance was accepted at $p \leq 0.05$.
We calculated a sample size for the time of laryngeal tube placement depending on the training techniques after nine tests. A four-group (Video, Lecture teaching, Peyton-4, and Peyton-5) one-way ANOVA with a 0.05 two-sided significance level will have more than 80% power to detect a difference in means of 5.0 sec, assuming that the standard deviation is 5.0 sec when the sample sizes in each of the four groups is at least 23 probands.

III. Results

3.1 Recruitment:

All 100 first-year students of the emergency medicine school (Homburg/Saar, Germany) were included in this study. After randomising the 100 probands into four groups. Six of these randomised probands did not meet inclusion criteria resulting in a final study population of 94 individuals.

3.2 Baseline data:

Table 2 provides general information about the characteristics of the probands. Gender, age, and their marks of emergency medical technician school were comparable between the groups. The A-level graduation was significantly more frequent in the Video (70%), Peyton-4 (68%) and Peyton-5 Groups (58%) compared with the Lecture Group (33%; $p<0.001$).

3.3 Numbers analysed:
The groups included the following numbers of probands: Video n=23, Lecture teaching n=24, Peyton-4 n=22, and Peyton-5 n=25.

3.4 Outcomes
3.4.1 Mean time of laryngeal tube placement depending on the training techniques:
The mean time of 10 laryngeal tube placements after the teaching course is shown in Figure 1. The Groups Video and Lecture teaching needed significantly more time compared with Peyton-4 ($p<0.001$) and Peyton-5 (Video: 28.0±13.0 sec; Lecture: 27.3±12.5 sec; Peyton-4: 22.7±7.1 sec; Peyton-5: 21.7±7.4 sec; $p<0.001$).
The median of the mean time of laryngeal tube placement was 23.89 seconds for all groups. Table 3 describes the factor that needs less than 23.89 seconds for laryngeal tube placement compared with Group 1 (Video). The Lecture Group did not differ significantly compared with the Video Group. In contrast, Peyton-4 (crude OR: 4.00, 95% CI 1.16–13.90, p=0.029) and Peyton-5 (crude OR: 7.24, 95% CI 2.02–25.96, p=0.002) were significantly faster compared with the video training.
Because A-level was significantly distributed between the groups, we made an adjustment for A-level. After adjustment, Peyton-4 (adjusted OR: 4.01, 95% CI 1.16 – 14.07, p=0.028) and Peyton-5 (adjusted OR: 7.73, 95% CI 2.12 – 28.36; p=0.002) remained an independent factor to decrease the time of larynx mask insertion. Goodness of fit for the adjusted model was assessed by Hosmer-Lemeshow-tests and was not statistically significant.

3.4.2 Time of laryngeal tube placement for each test depending on the training techniques:
The participants in the Groups Peyton-4 and Peyton-5 were significantly faster in the first try compared to the Groups Video and Lecture (Video: 49.4±20.9 sec; Lecture: 53.3±15.2 sec; Peyton-4: 35.1±11.5 sec; Peyton-5: 25.8±7.4 sec; $p<0.001$).
The Video and Lecture Groups were significantly faster in laryngeal tube placement in the second test compared with the first test (Figure 2). After four tests, the Video and Lecture Groups had comparable results in laryngeal tube placement compared with Peyton-5.
Peyton-4 was significantly faster in the first two tests than the Video and Lecture Groups. There was no significant difference between Peyton-4 and the other groups after the second test. Interestingly, after nine tests, the time for laryngeal tube placement with Peyton-5 was significantly faster compared with Video and Lecture (Video: 23.0±7.4 sec; Lecture: 22.4±6.9 sec; Peyton-4: 19.2±4.4 sec; Peyton-5: 18.4±5.1 sec; $p<0.001$).

3.4.3 Success rates of laryngeal tube placement:
There were no statistical differences in the success rates between all groups (Video: 95%; Lecture: 92%; Peyton-4: 93%; Peyton-5: 97%; Figure 3).

IV. Discussion

In the present randomised trial of 94 probands, Peyton's-five-step-approach was strongly associated with a reduced time of laryngeal tube placement. Comparing students who graduated from secondary school without any practical knowledge about emergency medicine, this is the first study to show that Peyton's-four- and Peyton's-five-step-approach are not only superior to video podcast and teacher-centred courses, but that after adjustment of potential confounder, they remained an independent factor to decrease the time of laryngeal tube placement with successful airway management.

To improve preclinical treatment, all paramedics should be able to perform a sufficient cardiac-pulmonary reanimation including supraglottic airway management so that it will be possible to save time until the emergency doctor arrives. Accordingly, a skilful application of the laryngeal tube is necessary. Many studies still advocate simulation as a means of transferring learned skills to clinical practice.[11-15] Assuming that people are able to understand and reproduce the learning content better and notably faster by multiple demonstrations within a scenario,[16] we performed a study comparing teacher-present teaching and alternative media-support handling of the laryngeal tube with the interactive method by Peyton´s 4-step, respectively 5-step approach.

The efficiency and validity of the laryngeal tube as an aid in airway management for emergency medicine even through untrained personnel is confirmed again in this study.[17, 18] In line with previous studies[3, 17-19] and independent from the method of instruction, there was a high success rate in all groups without statistical differences between the singular teaching methods. This indicates that such technically simple skills can be reliably conveyed in many ways.[19, 20] Nevertheless, the time until the first respiration was significantly reduced using Peyton's-four- and Peyton's-five-step-approach compared to video podcast and teacher-centred courses.

Assessing the realised time of laryngeal tube insertion of each test, we can see an obvious superior outcome in the Groups 3 and 4 learning by the demonstration approach. These participants were in the majority and their 10 tests were equally fast. At the end of the measurement series, the fixed procedure times of Groups 1 and 2 drew closer to Groups 3 and 4 but still did not reach their constant lower time in the 10 tests. Based on this perception, we hypothesise that repeated demonstrations and progressive personal involvement of the examinee into the scenario results in a faster comprehension and better reproduction of this act. Especially the last step of the Peyton's-five-step-approach (the independent repeated practice of the procedure) seemed to be of great advantage to the student.

This assumption is affirmed by many studies.[20, 21] Hermann W. et. al also came to this conclusion in their investigations that such practical skills can be performed faster and safer when the test persons were able to see the procedure repeatedly and first and foremost were able to repeat the procedure themselves.[21]

Nonetheless, the results of our investigations go even further to suggest that a standardised introduction using the Peyton's 5-step-approach with subsequent multiple repetitions of the predominating procedure provides the student with a significant time advantage.

The learning curve did not level off by most of the students after passing through a tenfold training cycle; the learning process was concluded. The insertion of the laryngeal tube was safely, target-oriented, and successfully performed without significantly changing the required time. Consequently, Group 4, who was instructed according to the 5-step-approach, was the group with the consistently shortest importation time, whereas, the results of the other groups during the measurements of the learning curve consistently improved and approached the peaks of Group 4 only near the end of the practice series.

Our theory that the learning process of Group 4 was already completed is affirmed through the investigations of Konrad who proved that „The process of learning manual skills in anaesthesia is characterised by a rapid improvement of success during the first 20 attempts".[7] Therefore, Peyton's 5-step-approach is excellently suitable as a training aid in order to convey simple manual skills. Through the repeated practice in Step 5, the learning curve already shifts in the teaching unit and assures a constant, subsequent use of the learned skills in the actual daily routine, and therefore, a higher patient security. The patient as an object of practice is no longer applicable.

Limitation

It must be taken into consideration that new school graduates who were involved as probands in our study were medical laypersons without any practical experience in emergency services, device-related knowledge, or previous medical education.

This must be assessed, however, as a great advantage since all probands started the examination with the same prerequisites. This was the first contact with the laryngeal tube for all participants; all were taught the same methods of application, and no one had to accommodate, defer himself, nor rather disregard the implementation technique they may have learned ahead of time.

Regarding the results of Groups 2-4, one must take into account that the training success depends greatly on quality and competence of the teacher.[9] Therefore, in our study we used the same teacher in all groups.

V. Conclusion

The combination of theoretical knowledge and practical skills training in the Peyton's-five-step-approach leads to the best results and timing in laryngeal tube placement compared with video podcast, teacher-centred course, and Peyton's-four-step-approach.

Acknowledgments:

We thank Karen Schneider for critical revision and correction of language.

References

[1]. Bullock I: Skill acquisition in resuscitation. Resuscitation 2000, 45(2):139-143.
[2]. Deakin CD, Nolan JP, Soar J, Sunde K, Koster RW, Smith GB, Perkins GD: European Resuscitation Council Guidelines for Resuscitation 2010 Section 4. Adult advanced life support. Resuscitation 2010, 81(10):1305-1352.
[3]. Schalk R, Byhahn C, Fausel F, Egner A, Oberndorfer D, Walcher F, Latasch L: Out-of-hospital airway management by paramedics and emergency physicians using laryngeal tubes. Resuscitation 2010, 81(3):323-326.
[4]. Berlac P, Hyldmo PK, Kongstad P, Kurola J, Nakstad AR, Sandberg M: Pre-hospital airway management: guidelines from a task force from the Scandinavian Society for Anaesthesiology and Intensive Care Medicine. Acta Anaesthesiol Scand 2008, 52(7):897-907.
[5]. Bernhard M, Beres W, Timmermann A, Stepan R, Greim CA, Kaisers UX, Gries A: Prehospital airway management using the laryngeal tube. An emergency department point of view. Anaesthesist 2014, 63(7):589-596.
[6]. Komatsu R, Kasuya Y, Yogo H, Sessler DI, Mascha E, Yang D, Ozaki M: Learning curves for bag-and-mask ventilation and orotracheal intubation: an application of the cumulative sum method. Anesthesiology 2010, 112(6):1525-1531.

[7]. Konrad C, Schupfer G, Wietlisbach M, Gerber H: Learning manual skills in anesthesiology: Is there a recommended number of cases for anesthetic procedures? Anesth Analg 1998, 86(3):635-639.
[8]. Paal P, Herff H, Mitterlechner T, von Goedecke A, Brugger H, Lindner KH, Wenzel V: Anaesthesia in prehospital emergencies and in the emergency room. Resuscitation 2010, 81(2):148-154.
[9]. Sopka S, Biermann H, Rossaint R, Knott S, Skorning M, Brokmann JC, Heussen N, Beckers SK: Evaluation of a newly developed media-supported 4-step approach for basic life support training. Scand J Trauma Resusc Emerg Med 2012, 20:37.
[10]. Lake FR, Hamdorf JM: Teaching on the run tips 5: teaching a skill. Med J Aust 2004, 181(6):327-328.
[11]. Issenberg SB, McGaghie WC, Petrusa ER, Lee Gordon D, Scalese RJ: Features and uses of high-fidelity medical simulations that lead to effective learning: a BEME systematic review. Med Teach 2005, 27(1):10-28.
[12]. Ruesseler M, Weinlich M, Muller MP, Byhahn C, Marzi I, Walcher F: Republished: Simulation training improves ability to manage medical emergencies. Postgrad Med J 2012, 88(1040):312-316.
[13]. Steinemann S, Berg B, Skinner A, DiTulio A, Anzelon K, Terada K, Oliver C, Ho HC, Speck C: In situ, multidisciplinary, simulation-based teamwork training improves early trauma care. J Surg Educ 2011, 68(6):472-477.
[14]. Surcouf JW, Chauvin SW, Ferry J, Yang T, Barkemeyer B: Enhancing residents' neonatal resuscitation competency through unannounced simulation-based training. Med Educ Online 2013, 18:1-7.
[15]. Wheeler DS, Geis G, Mack EH, LeMaster T, Patterson MD: High-reliability emergency response teams in the hospital: improving quality and safety using in situ simulation training. BMJ Qual Saf 2013, 22(6):507-514.
[16]. Soar J, Monsieurs KG, Ballance JH, Barelli A, Biarent D, Greif R, Handley AJ, Lockey AS, Richmond S, Ringsted C et al: European Resuscitation Council Guidelines for Resuscitation 2010 Section 9. Principles of education in resuscitation. Resuscitation 2010, 81(10):1434-1444.
[17]. Asai T, Moriyama S, Nishita Y, Kawachi S: Use of the laryngeal tube during cardiopulmonary resuscitation by paramedical staff. Anaesthesia 2003, 58(4):393-394.
[18]. Hernandez MR, Klock PA, Jr., Ovassapian A: Evolution of the extraglottic airway: a review of its history, applications, and practical tips for success. Anesth Analg 2012, 114(2):349-368.
[19]. Lund F, Schultz JH, Maatouk I, Krautter M, Moltner A, Werner A, Weyrich P, Junger J, Nikendei C: Effectiveness of IV cannulation skills laboratory training and its transfer into clinical practice: a randomized, controlled trial. PLoS One 2012, 7(3):e32831.
[20]. Orde S, Celenza A, Pinder M: A randomised trial comparing a 4-stage to 2-stage teaching technique for laryngeal mask insertion. Resuscitation 2010, 81(12):1687-1691.
[21]. Herrmann-Werner A, Nikendei C, Keifenheim K, Bosse HM, Lund F, Wagner R, Celebi N, Zipfel S, Weyrich P: "Best practice" skills lab training vs. a "see one, do one" approach in undergraduate medical education: an RCT on students' long-term ability to perform procedural clinical skills. PLoS One 2013, 8(9):e76354.

Figure and table list:

Table 1: Teaching contents for all four groups about the theoretical instruction of the equipment, all key information about the laryngeal tube, and procedural insertion of the laryngeal tube.

General information of the laryngeal tube	- History - Structure - Sizes and colour identification
Function of the laryngeal tube	- Indications and application spectrum in emergency and hospital medicine
Correct insertion	- Head position: neutral position or with slight inclination - Jaw-thrust - Mouth opening with the left hand - Insertion technique - Blocking of the laryngeal tube - Fixation
Ventilation	- By hand with a ventilation bag - Mechanical ventilation

Table 2: Population characteristics

	Video *(n=23)*	***Lecture*** *(n=24)*	***Peyton-4*** *(n=22)*	***Peyton-5*** *(n=25)*
Male gender (%)	18 (78)	14 (58)	14 (64)	18 (72)
Age (a)	18.0 ±6.7	19.5 ±3.2	19.0 ±13.4	19.0 ±8.0
A-level (%)	16 (70)*	8 (33)	15 (68) *****	13 (52) *****
Emergency Medical Technician - Basic				
written examination (mark)	3.0 ±0.8	3.0 ±0.7	3.0 ±0.7	3.0 ±0.7
oral examination (mark)	3.0 ±1.1	3.0 ±1.2	3.0 ±1.1	3.0 ±1.1
practical examination (mark)	3.0 ±1.1	3.0 ±1.2	3.0 ±1.1	3.0 ±1.2
failed an exam (%)	2 (9)	2 (8)	2 (9)	3 (12)

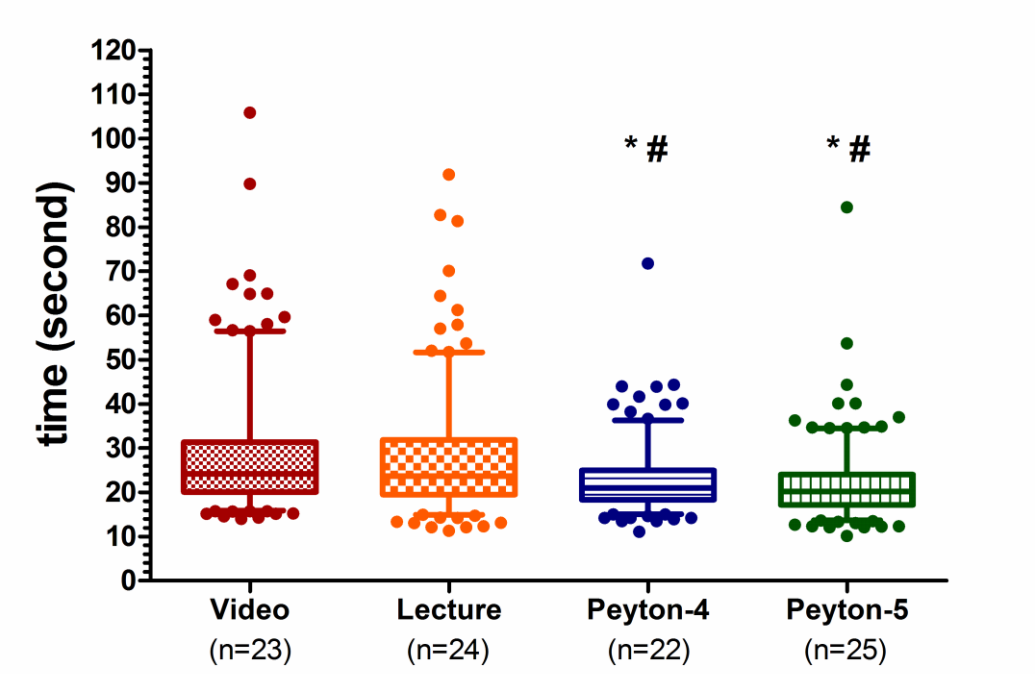
SD (standard deviation). * p<0.05 versus Lecture. p-values < 0.05 were considered as statistically significant

Table 3: Influence of training techniques at the mean time of laryngeal tube placement

Influence of training techniques on the time of larynx mask insertion (n=94)				
		Odds Ratio	***95% CI***	***p-value***
Video	**Crude**	1		
	Adjusted	1		
Lecture	**Crude**	0.93	0.27 – 3.29	*0.94*
	Adjusted	1.05	0.29 – 3.86	*0.94*
Peyton-4	**Crude**	**4.00**	1.16 – 13.90	***0.029***
	Adjusted	**4.01**	1.16 – 14.07	***0.028***
Peyton-5	**Crude**	**7.24**	2.02 – 25.96	***0.002***
	Adjusted	**7.73**	2.12 – 28.36	***0.002***

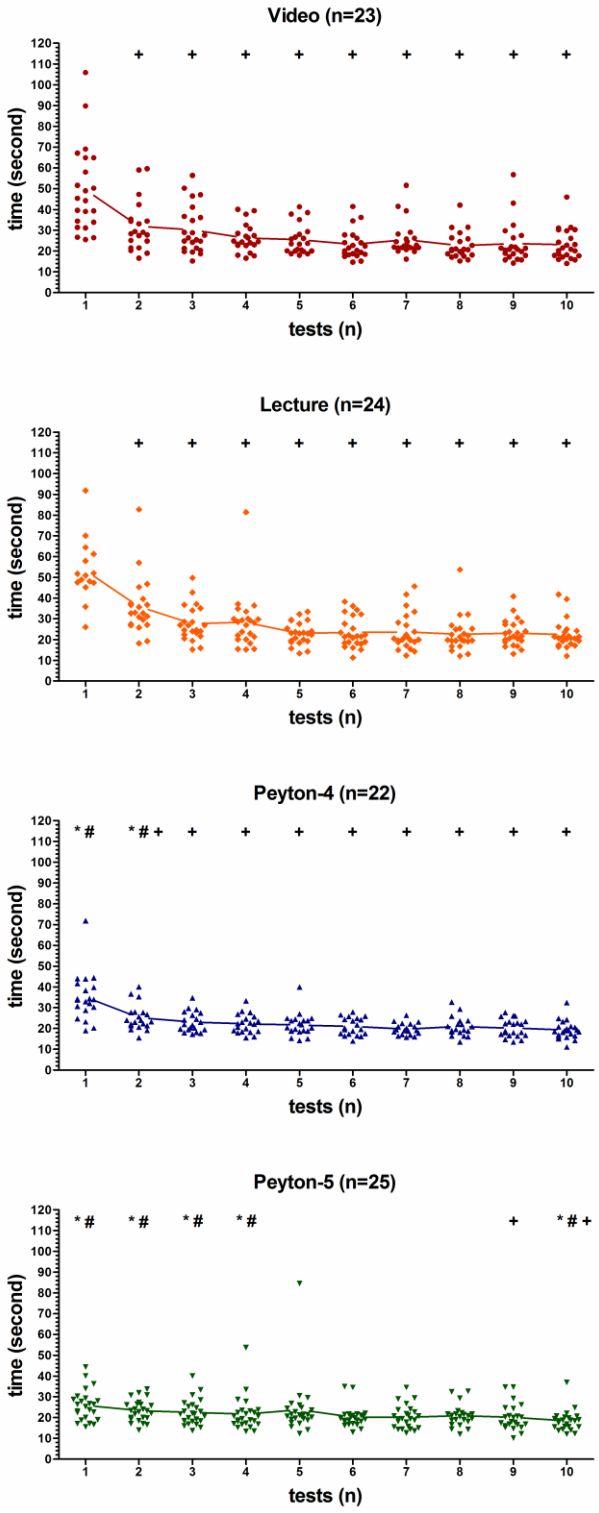
The mean time is the mean time of the 10 tests. The 10 tests included 10 separately performed laryngeal tube placements. The median of the time for the 10 tests of laryngeal tube placement was 23.89 seconds for all groups. Table 3 describes the factor that needs less than 23.89 seconds for laryngeal tube placement compared with Group 1 (Video). Data are expressed as odds ratios with 95% confidence interval (CI) and adjusted for A-level. p-values < 0.05 were considered as statistically significant.

Figure 1: The mean time of laryngeal tube placement



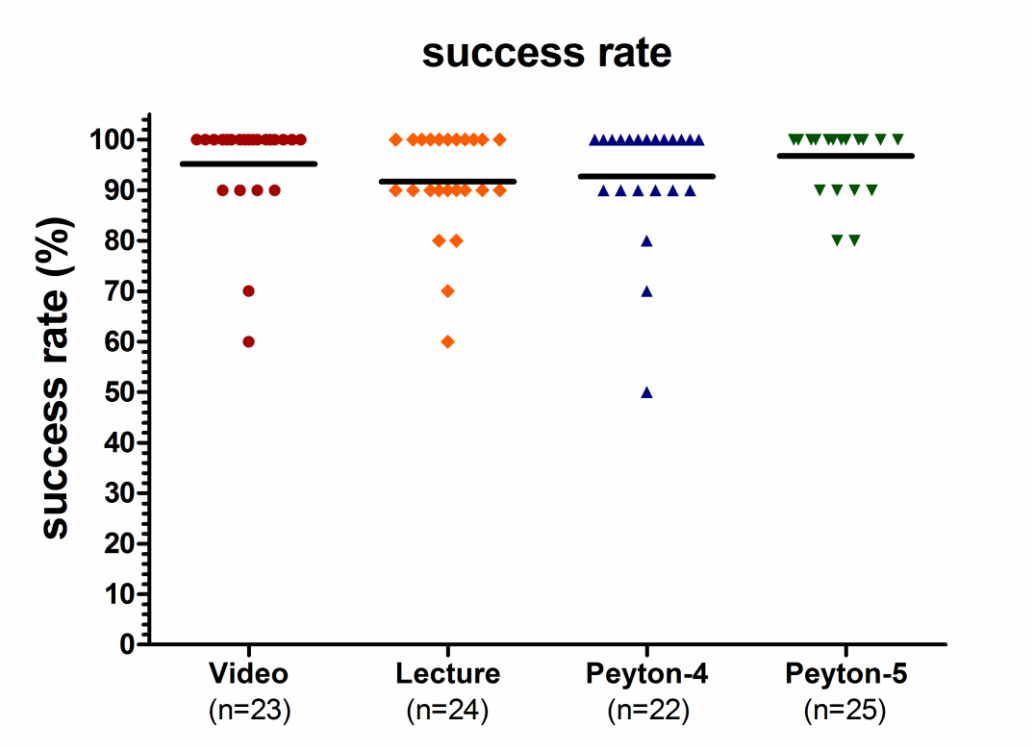
Whiskers 5-95 percentile. Line in the box: median. The mean time is the mean time of the 10 tests. The 10 tests included 10 separately performed laryngeal tube placements. # $p<0.05$ versus Video. * $p<0.05$ versus Lecture. p-values < 0.05 were considered as statistically significant.

Figure 2: Time of laryngeal tube placement for each test



Connecting line: mean. Each dot plot is one proband of the group. The comparison of the four teaching techniques included 10 separately performed laryngeal tube placements (10 tests). Each test of laryngeal tube placement included: mouth opening by using the cross handle, laryngeal tube insertion to the point until the mark of the tooth matches the height of the incisor (upper jaw), blocking of the laryngeal tube, mechanical ventilation by using an Ambu breathing bag and successfully moving both sides of the thorax. # $p<0.05$ versus Video. * $p<0.05$ versus Lecture. + $p<0.05$ versus test 1. p-values < 0.05 were considered as statistically significant.

Figure 3: Success rate of laryngeal tube placement



Black line: mean. Each dot plot is one proband of the group.