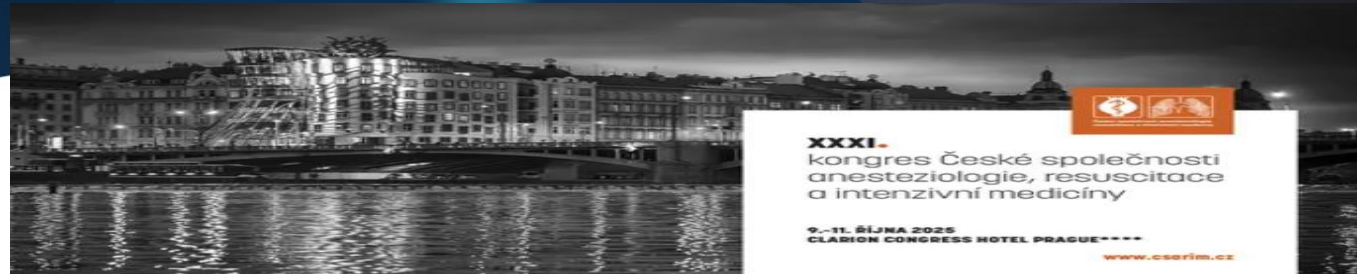




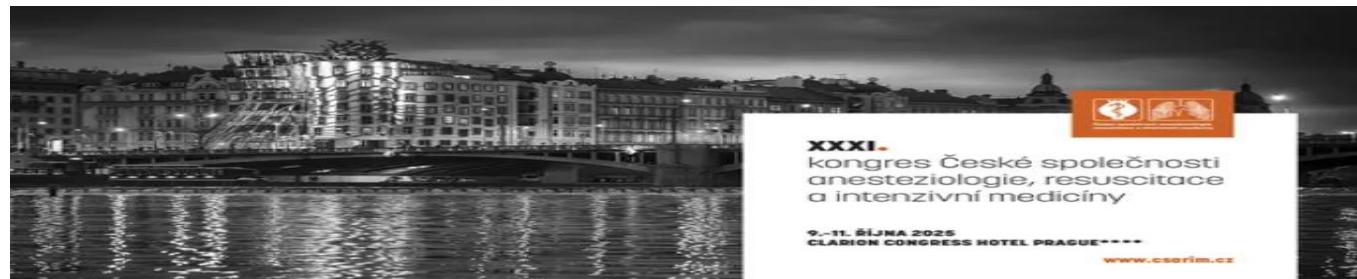
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NOVÉ MOŽNOSTI SIMULACE V ZAJIŠTĚNÍ DÝCHACÍCH CEST



Pavel Michálek
KARIM 1.LF UK a VFN Praha



DEKLARACE O STŘETU ZÁJMU

Pavel Michálek nemá žádný
přímý střet zájmů v
souvislosti s touto
přednáškou



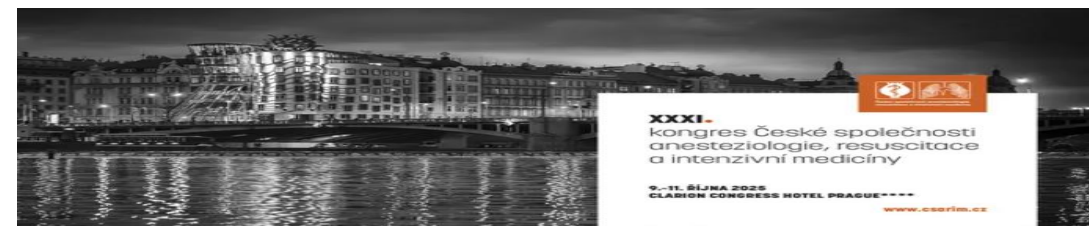


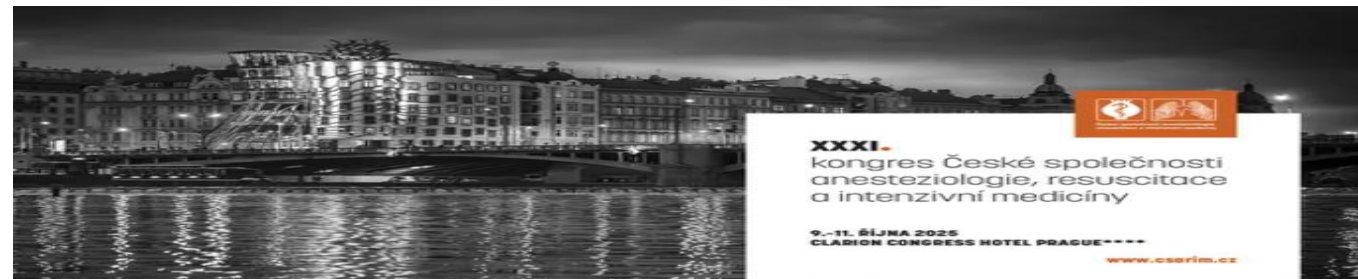
VFN PRAHA

❖ „Hlavní dovedností vyžadovanou od anesteziologa je zajistit bezchybně dýchací cesty“

- (Rosen a Latto. Balliere Tindall, Philadelphia 1984)

- Neúspěšná intubace – 1:2.000 (0,05%) (Frerk, Br J Anaesth 2015), u císařského řezu – 1:443 (0,25%) (Kinsella, Int J Obstet Anesth 2015), na urgentním příjmu nebo JIP – 1:50-100 (1-2%) (Nolan, Anaesthesia 2011)
- Chirurgie hlavy a krku: obtížná – 15,4%, neúspěšná intubace – 1,5% (Wong, Proc Singapore Healthcare 2016)
- Obtížná intubace v přednemocniční medicíně – 11% (Freund, Eur J Emerg Med 2012), neúspěšná – 9,5% (Goto, Scand J Trauma Resusc Emerg Med 2015)
- „Cannot intubate, cannot oxygenate“ – 1:5.000 (0,02%) (Cook, Br J Anaesth 2012), ale podílí se na 25% úmrtí spojených s anestezií (Frerk, NAP4 Report 2011; Strang a Michálek, Anest Intenziv Med 2006)
- V UK 16 úmrtí ve spojení se zajištěním dýchacích cest při anestezii, 18 na ARO/JIP, 4 na urgentním příjmu během roku 2010 (Cook, Br J Anaesth 2011)





Simulation in airway management teaching and training

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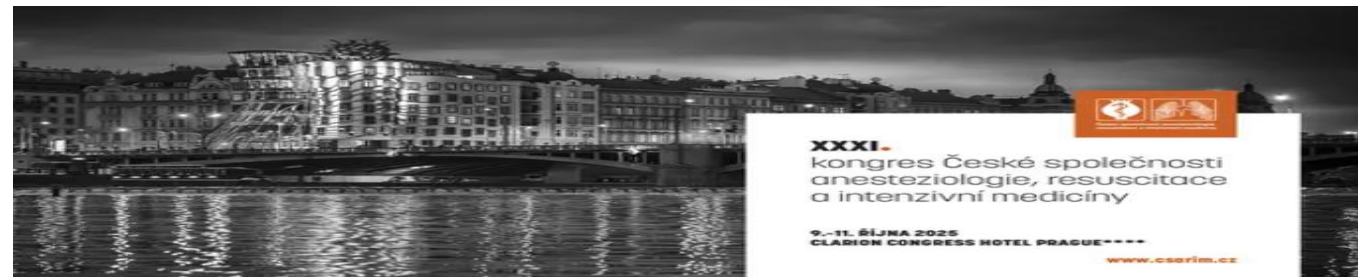
Figure 1: Kirkpatrick Model

Table 1: Strength and limitations of simulation-based airway management training

Strength	Limitation
• Allow repeated practice • Hands-on invasive procedure • Creation of rare clinical situation • Use of airway device • Distraction-free • Risk-free for patient • Team co-ordination • Feedback and debriefing	• Reality or Fidelity of simulator • Cost • Need Instructors

Table 2: Technical and non-technical airway management skills

Technical skill	Non-technical skill
Basic • Bag and mask ventilation • Oropharyngeal/nasal airway insertion • Use of stylet/bougie • Supraglottic airway device Insertion • Laryngoscopy • Endotracheal Intubation Advanced • Cricothyroidotomy • Fiberoptic intubation • Lung isolation techniques • Airway Ultrasound • Robotic intubation	• Communication • Coordination • Collaboration • Teamwork • Leadership



Review Article

Effect of simulation-based team training in airway management: a systematic review

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Summary

Major complications associated with airway management are rare but often have serious consequences. Complications frequently result from failures in communication and teamwork. We performed a systematic review on the effect of simulation-based team training on patient outcomes, healthcare professionals' clinical performance and preparedness for airway management. We included studies with simulation-based team training in airway management as the educational intervention, using any comparator, outcome and design. Two authors independently selected articles and assessed risk of bias using the Medical Education Research Study Quality Instrument and Newcastle–Ottawa Scale–Education. We screened 1248 titles and evaluated 116 full-text articles. Twenty-two studies were included. The Kirkpatrick model for evaluation of training was used to organise outcomes. Four studies reported patient-centred outcomes (Kirkpatrick level 4), and three studies' outcomes related to healthcare professionals' clinical performance (Kirkpatrick level 3). The results were ambiguous and the studies had significant methodological limitations, making it difficult to draw conclusions on the effect of simulation-based team training. To describe preparedness for airway management, we used outcomes related to participants' attitudes or perceptions and outcomes related to knowledge or skills demonstrated in a test setting (Kirkpatrick level 2). Most studies reporting these outcomes were in favour of simulation-based team training, but were prone to bias. We consider the current evidence to be weak and recommend that future research should be based on randomised study designs and patient-centred outcomes.

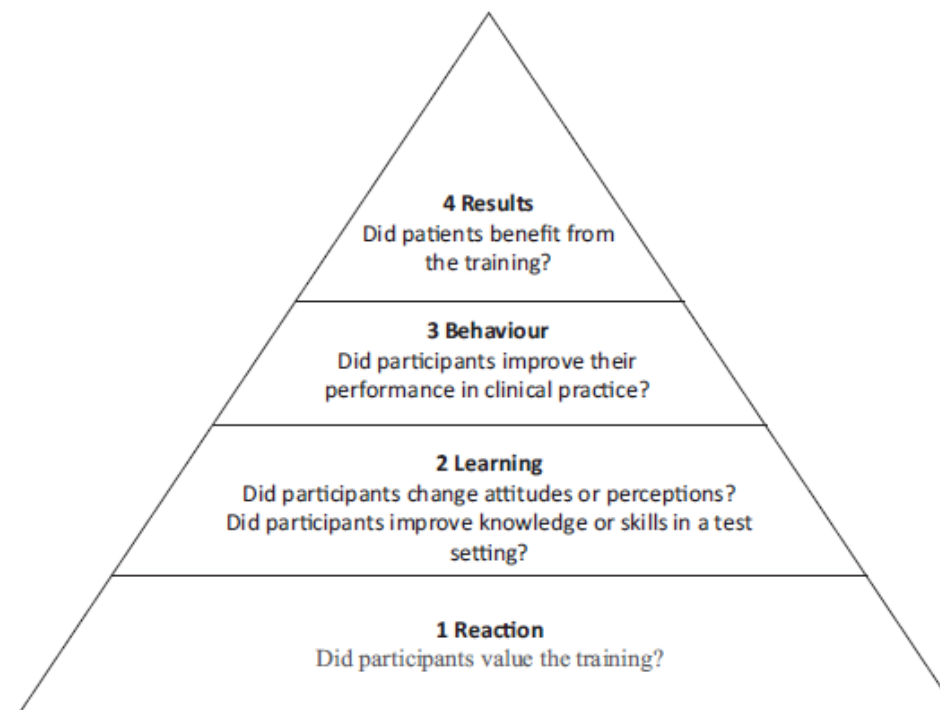
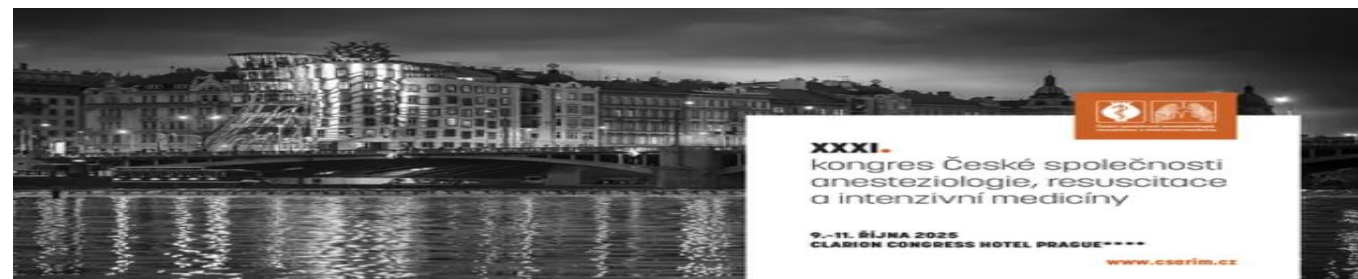


Figure 1 Kirkpatrick's model for evaluation of training.



ORIGINAL RESEARCH ARTICLE

Open Access

Managing the airway catastrophe: longitudinal simulation-based curriculum to teach airway management



Lily H. P. Nguyen^{1,2,5*} , Ilana Bank^{2,3}, Rachel Fisher^{2,4}, Marco Mascarella¹ and Meredith Young²

Abstract

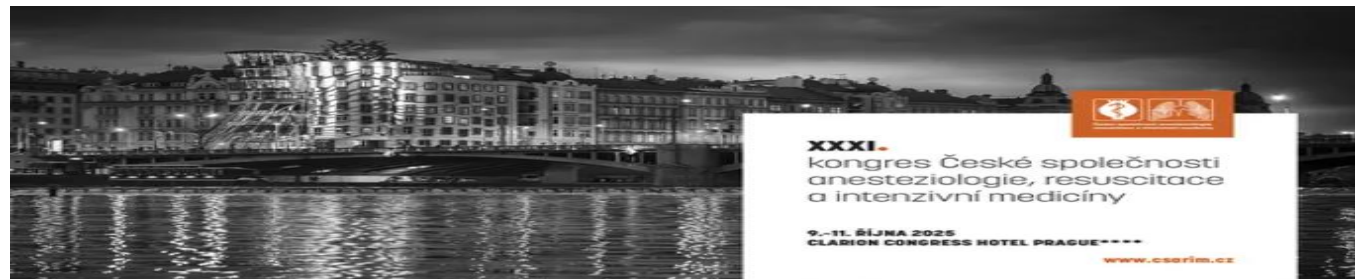
Background: A longitudinal curriculum was developed in conjunction with anesthesiologists, otolaryngologists, emergency physicians and experts in medical simulation and education.

Methods: Residents participated in four different simulation-based training modules using animal models, cadavers, task trainers, and crisis scenarios using high fidelity manikins. Scenarios were based on various clinical settings (i.e. emergency room, operating room) and were followed by video-assisted structured debriefings. Participants completed both a self-assessment questionnaire and an exit survey using five-point Likert scales.

Results: 31 otolaryngology residents participated in the curriculum. Residents reported simulation training significantly improved technical skills such as tracheostomy, cricothyroidotomy and pediatric intubation ($p < 0.05$ for all). Non-technical skills, including communication, delegation and management were significantly improved on post-test surveys in simulated crisis scenarios ($p < 0.05$ for all). 90 (28/31) of participants found simulations to be very realistic. Junior residents placed increased value on didactic teaching and procedural skills, while senior residents on crisis scenarios. Survey results indicated that $> 90\%$ (28/31) of participants found the modules of the curriculum to be useful and would recommend them to others.

Conclusion: A longitudinal simulation-based medical curriculum can be an effective method to teach airway management and teamwork skills to otolaryngology residents.

Keywords: Simulation, Otolaryngology, Pediatric airway, Residency, Education, Curriculum



HISTORIE

- První intubační model – Ambu Phantom v roce 1958
- „Resuscitation Anne“ byla vytvořena Asmundem Laerdalem za spolupráce s dr. Peterem Safarem a dr. Jamesem Elamem v roce 1960
- Předlohou byla posmrtná maska 16-leté dívky utonulé v Seině v roce 1880

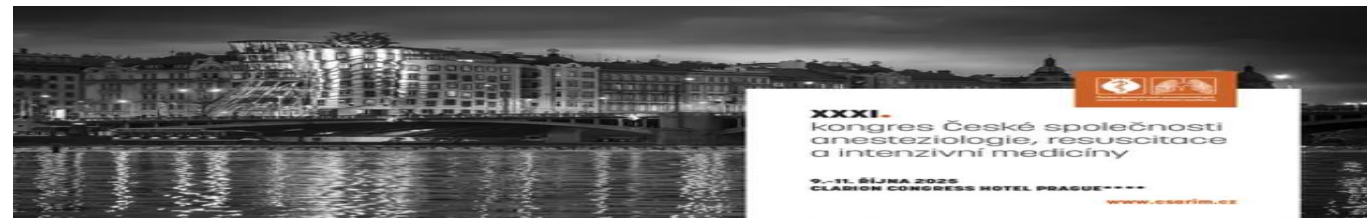


SIMULÁTORY OBTÍŽNÉ INTUBACE

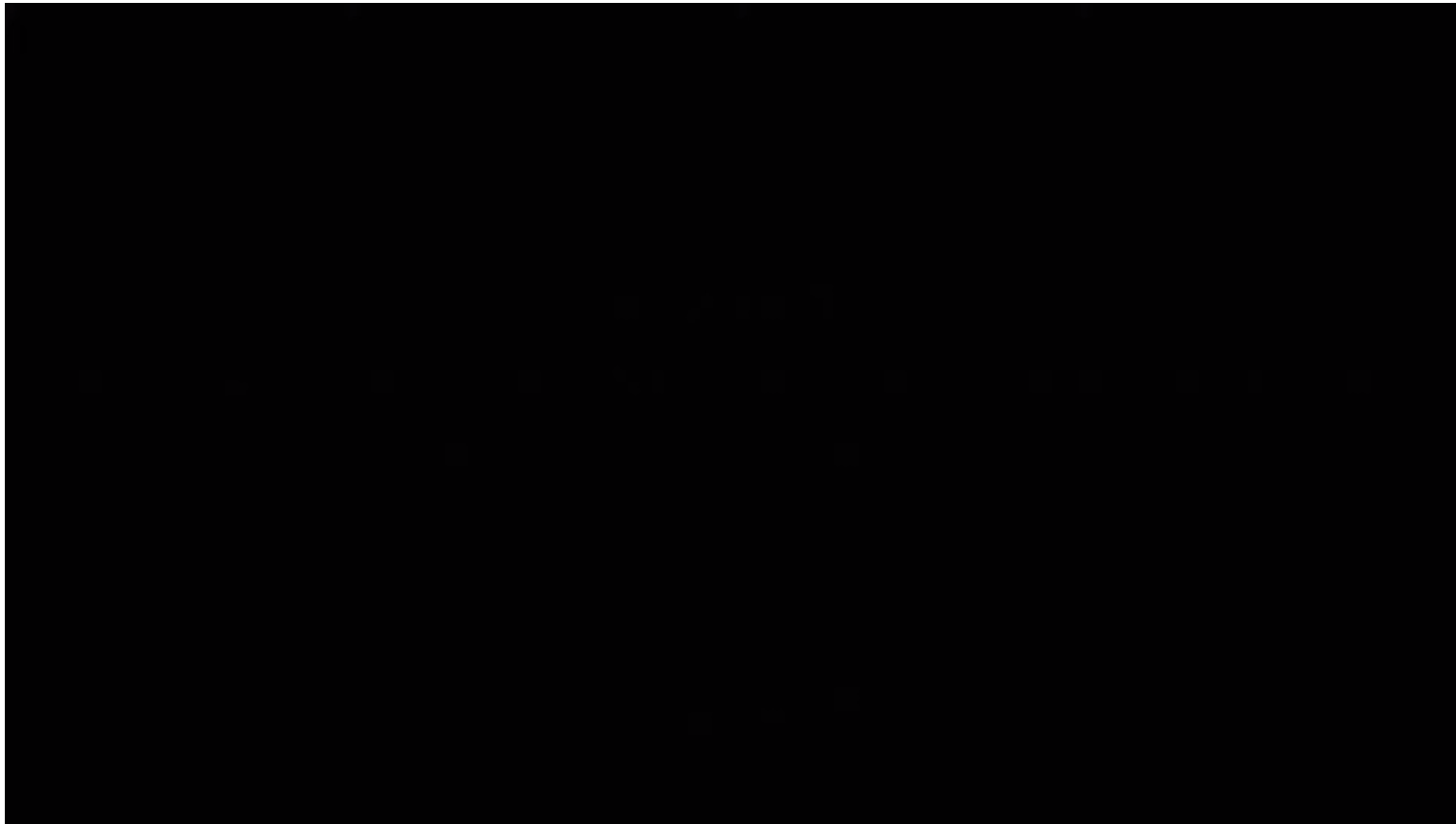
- KyotoKagaku (Japonsko) – DAM Simulator – Assessment System (11390-000), DAM Simulator – Training Model (11392-000)
- TruCorp (Belfast, Severní Irsko) - AirSim Difficult Airway Training Manikin
- BT Inc. (Korea) – DAM Training Simulator

- **Snížené otevření
úst/trismus**
Laryngospasmus
- **Otok jazyka**
- **Antepozice,
lateropozice hrtanu**
- **Imobilita krční páteře**

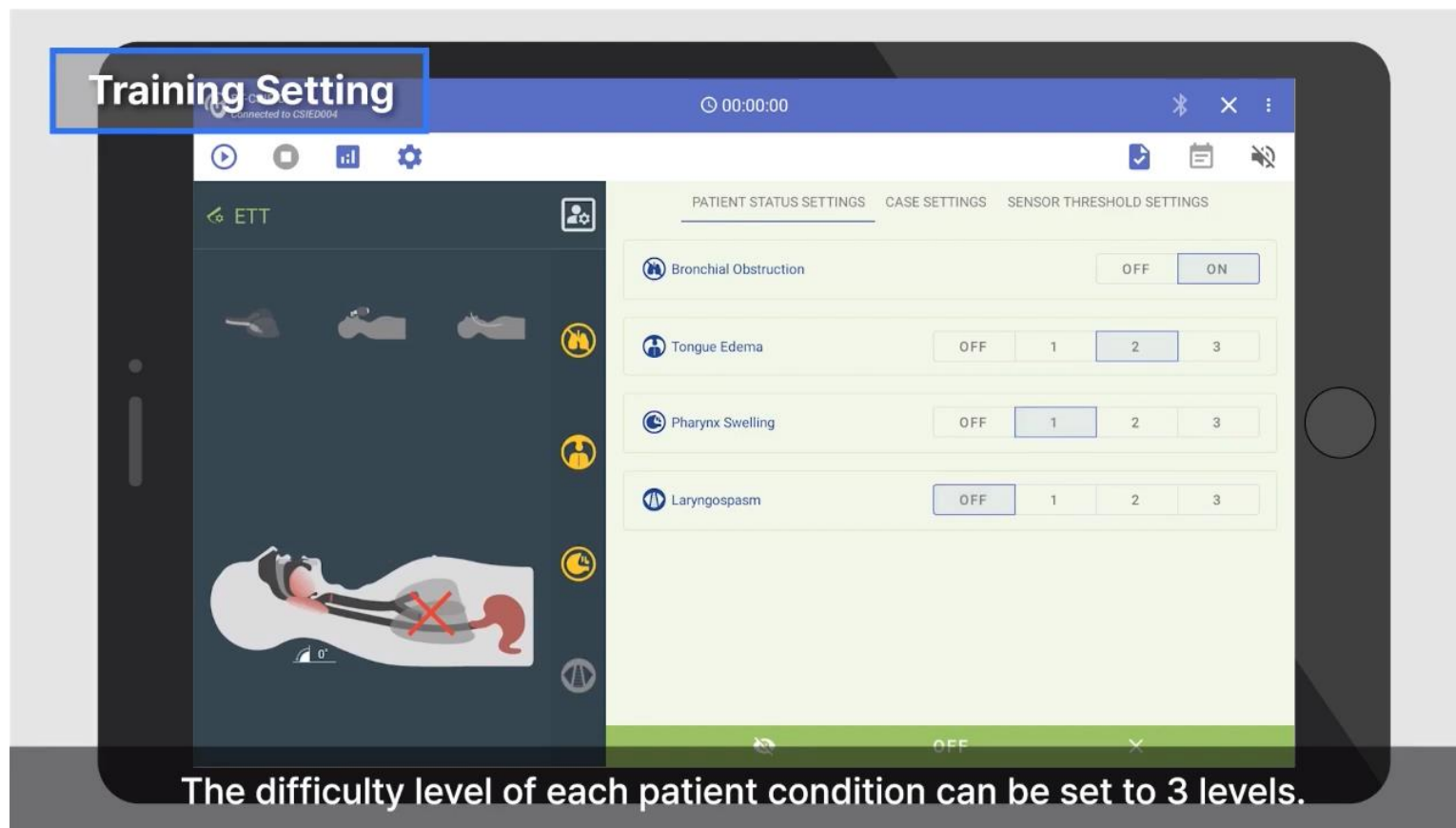


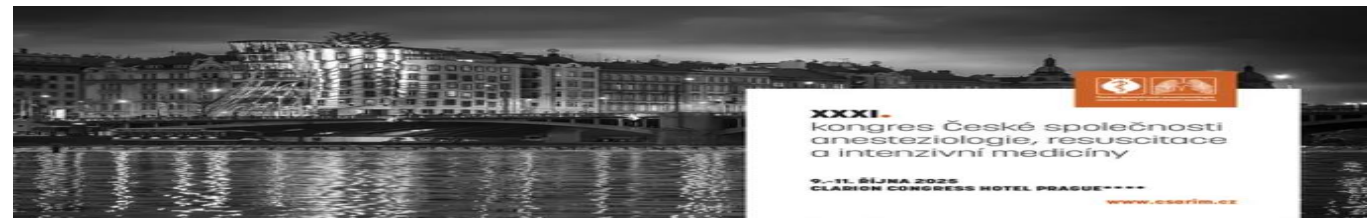


KYOTO KAGAKU DAM SIMULÁTOR



BT DAM TRAINING SIMULÁTOR



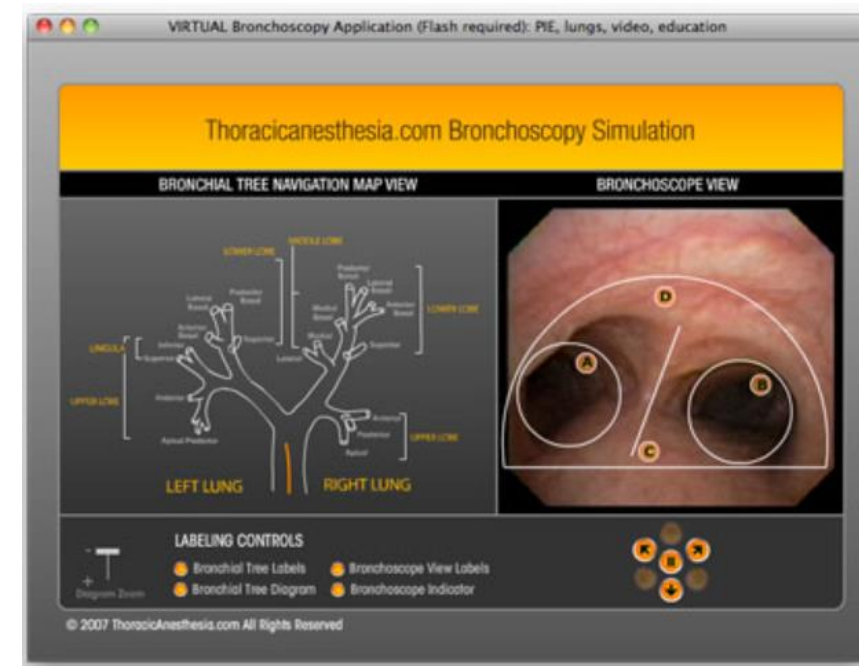


AIRSIM SIMULÁTOR



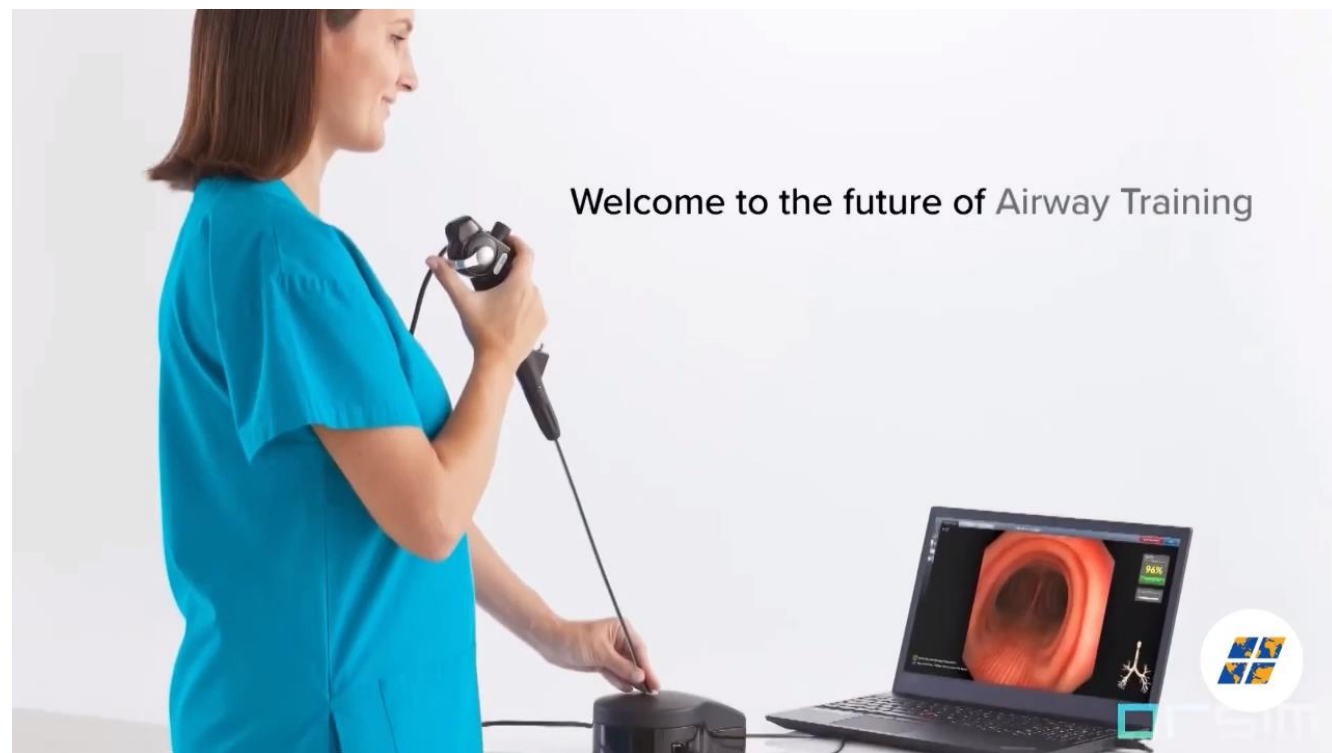
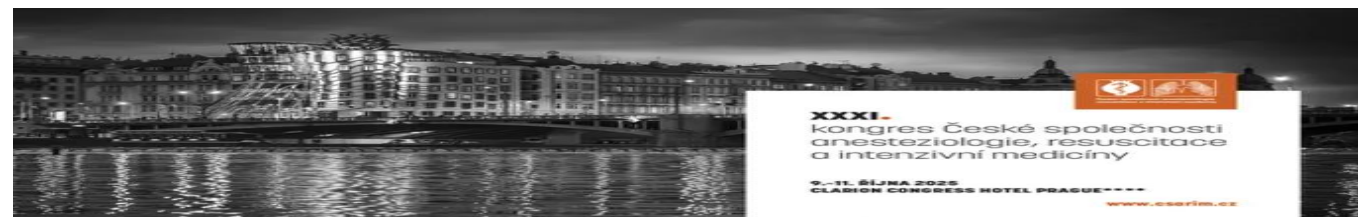
BRONCHOSKOPICKÉ SIMULÁTORY

- Nácvik obtížné intubace nosem i ústy
- Vytvoření scénářů nízké, střední a vysoké obtížnosti
- Dospělý i dětský model
- Vhodné i pro intervenční bronchology
- ORSIM, CASS, Virtual Bronchoscopy Simulator

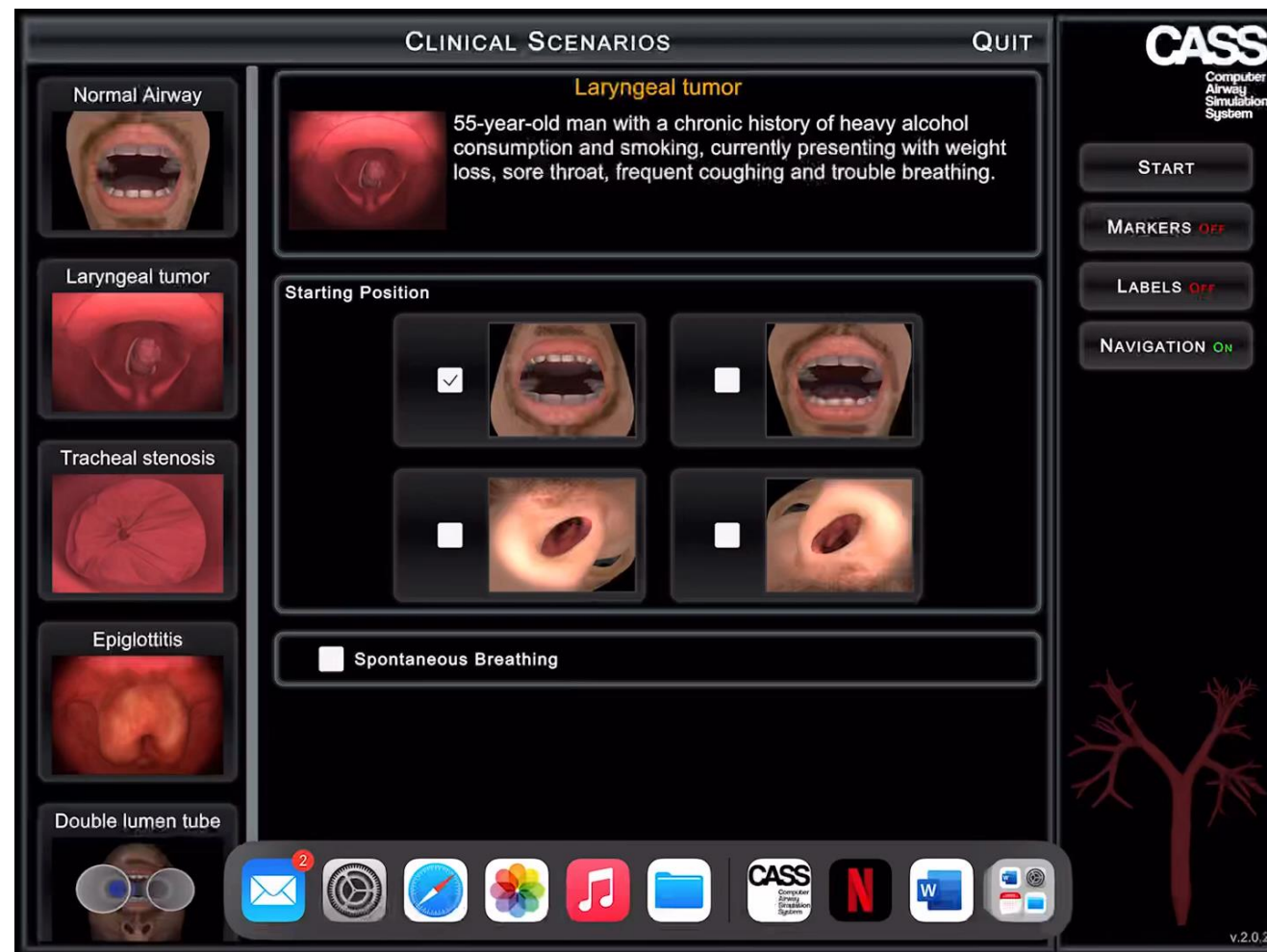
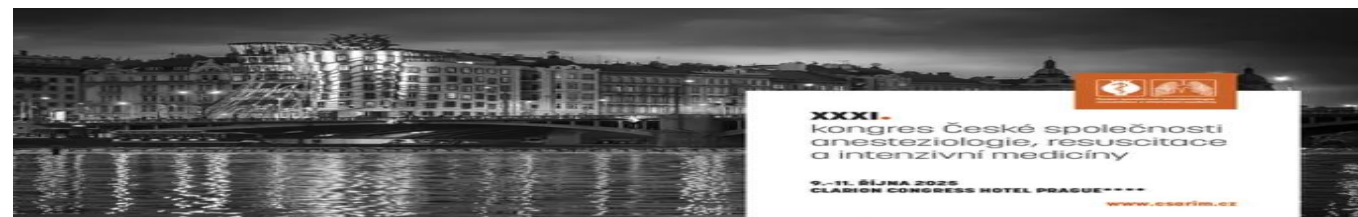




ORSIM

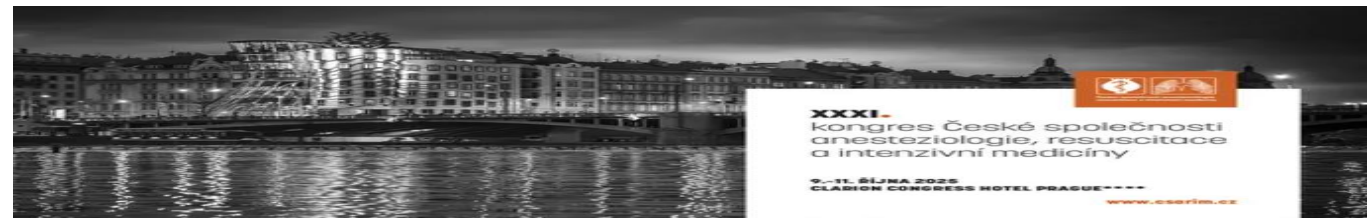


CASS





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SIMULACE NETECHNICKÝCH DOVEDNOSTÍ

- ❖ Speciální kurzy zaměřené na netechnické dovednosti
- ❖ Teach the Airway Teacher (TAT) kurz European Airway Management Society (EAMS)
- ❖ Obsah kurzu: způsoby výuky zajištění dýchacích cest; postupy, jak zorganizovat úspěšný kurz výuky zajištění dýchacích cest; postupy, jak motivovat zdravotníky; komplexní výuka psychomotorických dovedností; zhodnocení role lidských faktorů; komunikační dovednosti; debriefing; efektivní zpětná vazba a zhodnocení frekventantů



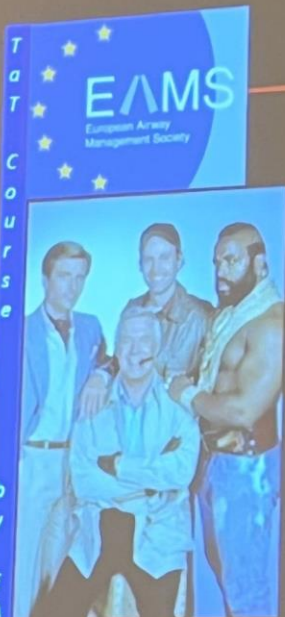


VFN PRAHA



tAt-Team

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- Pavel Michalek
- Xavi Onrubia
- Ana Isabel Pereira
- Jaume Puig
- Laura Reviriego
- Andres Roca de Togores
- Ayten Saraçoğlu
- Max Sorbello
- Sofia Torrinha



NETECHNICKÉ DOVEDNOSTI

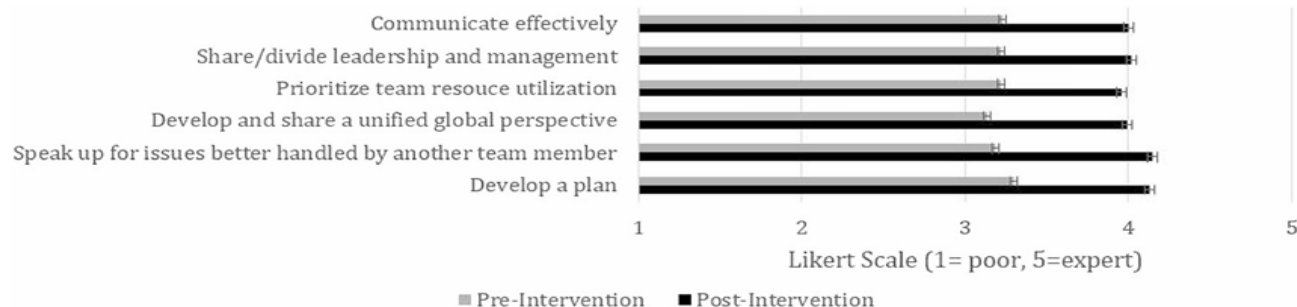


Fig. 3 Module 4 comparison of self-reported assessment of *Non-Technical Skills* before and after the intervention. Scores were rated on a Likert scale of 1–5 (1 = Poor, 5 = Expert. All items were statistically significant with a $p < 0.05$. CRM: Crisis resource management. RT: Respiratory therapist

Table 2 Individual and team CRM skills assessed

Individual CRM Skills

- 1) Identify and formulate a plan for an airway crisis
- 2) Effective leader in an airway crisis
- 3) Ensure effective communication
- 4) Delegate tasks
- 5) Use all available resources
- 6) Maintain a global perspective (avoid fixation errors)
- 7) Airway knowledge
- 8) Technical skills
- 9) Recognition of own limitations

Team CRM Skills

- 1) Identify issues in a crisis situation that could be better handled by others (call for help)
- 2) Develop a common plan to manage an airway crisis
- 3) Collaborate with others to anticipate and plan for issues in a crisis.

Adapted from Stanford Medicine Emergency Manual for crisis resource management key skills [31]

