**NOVICE AIRWAY “SPECIALIST” ONBOARDING WITH SIMULATION: A MULTIDISCIPLINARY BOOT CAMP FOR AIRWAY SKILLS**

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**Abstract**

**OBJECTIVE:** Otolaryngology and anesthesiology residents may be the first responders to an airway emergency, especially in their first weeks of training. However, they may be familiar with the armamentarium of airway maneuvers, the most basic of which may be distressing. Boot camp education has been shown to be effective in multiple disciplines. In this study, we examine whether a multidisciplinary boot camp style simulation course leads to improvement in novice airway provider comfort and competence.

**METHODS:** Participants in a multidisciplinary boot camp simulation course from 2013-2016 completed anonymous pre- and post-test questionnaires reporting their confidence for the airway skills or concept from the curriculum. Responses were on a Likert scale from 1 to 5: (1=not familiar to 5=extremely comfortable).

**RESULTS:** 40 participants completed pre-tests, and 42 participants completed post-tests. There were 16 otolaryngology residents, and 25 anesthesiology residents. Skills taught included maneuvers in the American Society of Anesthesiology (ASA) difficult airway algorithm and surgical airways (cricothyroidotomy, tracheotomy, and rigid bronchoscopy). Self-reported comfort with concepts increased for 100% of topics with the largest gains in mid-range complexity tasks such as two-person mask ventilation, flexible fiberoptic intubation, endotracheal intubation, and intubating LMA.

**CONCLUSIONS:** A multidisciplinary simulation boot camp for novice airway providers shows increase in comfort and awareness for all airway skills and conditions. The most significant improvement is in moderate complexity skills. Further research is needed into whether this learning translates into performance improvement.

**Introduction**

Many specialties including, general surgery, vascular surgery, neurosurgery, and anesthesiology use boot camps to transition medical students to residents or interns to specialty residents. While traditional medical teaching used the “learn one, do one, teach one” philosophy, simulation-based education offers numerous benefits for otolaryngology and anesthesiology residents and their future patients. Simulation offers a distraction free, low risk, and safe learning environment, whereas operating rooms and emergency departments are high stress, high risk learning environments. The first month of the new academic year also poses significant anxiety for residents, as there is an increase in mortality likely associated with new physicians taking on clinical responsibilities. Conversely, when residents acquire new skills on mannequins or trainers there is no potential harm to patients.

Starting out as a new, inexperienced physician as the primary responder to emergencies can be extremely stressful and anxiety producing. General surgical interns surveyed about their preparedness for their first year reported moderate preparedness for specific roles, and were least prepared for medicine. For anesthesia residents, there was a high confidence, ranging from 91% and 95% for the post course. For the most complex airway conditions and maneuvers, there was a 0% pre course comfort level.

The moderately complex airway management techniques had the most improvement, averaging 42% difference between pre- and post-course responses. These techniques include placement of nasal airway and LMA, endotracheal intubation, flexible fiberoptic intubation, endotracheal intubation, and intubating LMA.

**Methods and Materials**

To address the knowledge gap for novice airway providers, we developed a multidisciplinary boot camp style simulation course for increasing anesthesiology and otolaryngology residents to learn introductory airway skills and knowledge. This is a full day course repeated yearly combining didactic with interprofessional simulation activities related to each task. The overarching concept of the course is the ASA difficult airway algorithm as participants learn each task along the pathway to highlight the importance of airway maneuvers to manage the routine and difficult airway safely. Additionally, concepts related to surgical management (rigid bronchoscopy, tracheotomy, cricothyrotyotomy) and surgical alterations of the airway (laryngectomy) are taught.

Participants completed pre- and post-course self evaluations to rate how confident they felt with airway tasks or conditions. They rated themselves along a Likert scale from “no familiarity” to “very comfortable.”

**Results**

Between 2013 and 2016, 40 participants completed pre-tests, and 42 participants completed post-tests. There were 16 otolaryngology residents, and 25 anesthesiology residents. As this was a study of perceived comfort, all tasks related to surgical airway maneuvers and intubation were scored 100% (100% not familiar to 5= extremely comfortable). The lowest gains were in the most basic airway management techniques, mask ventilation and oral airway placement, and the most complex, rigid bronchoscopy, tracheotomy, cricothyroidotomy, and laryngectomy. For mask ventilation and oral airway placement, there was a high pre-test comfort level at 66% and 69%, rising to 86% and 95% for the post-course responses. For the most complex airway conditions and maneuvers, there was a 0% pre-course comfort level.

The moderately complex airway management techniques had the most improvement, averaging 42% difference between pre- and post-course responses. These tasks include placement of nasal airway and LMA, endotracheal intubation, flexible fiberoptic intubation, two person mask ventilation, video laryngoscopy (GlideScope), and intubating LMA.

**Discussion**

Simulation for skill building, especially for high stakes and low frequency event, has been increasingly recognized as useful by otolaryngologists, as well as other specialties, over the past 10 years. Simulation centers, with mannequins and other high fidelity simulation equipment, can be very useful for building skills. Boot camp style courses initiate residents who are popular in many specialties including anesthesiology, otolaryngology, emergency medicine, general surgery, among others.

Airway providers including anesthesiologists and otolaryngologists are called upon to be airway experts, and they may be the first responders to an airway emergency even in their first days in training when in reality they are novice airway providers. Many airway maneuvers such as mask ventilation and oral airway placement may be life-saving in an emergency setting and are often underestimated. Additionally, residents may not gain familiarity initially with moderately complex maneuvers such as flexible fiberoptic intubation, video laryngoscopy (GlideScope), and intubating LMA since these are lower frequency events and therefore ideally suited to simulation. The more advanced surgical airway maneuvers and conditions including cricothyroidotomy showed a lower comfort level post-course as expected for novices as the goal was to decrease the “no familiarity” responses.

**Conclusions**

- Simulation can be used in a multidisciplinary group to increase task comfort level for airway maneuvers.
- The highest improvement in task comfortability was reported in the moderately complex airway skills and concepts along the ASA difficult airway algorithm.
- Participants reported improved comfort level and awareness for all airway conditions and techniques.
- Further investigation is necessary to determine whether increased comfort level is correlated with increased skill or decreases time to competency.

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**References**


