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Uniform Clinical Evaluation for Video Laryngoscopy in Nurse Anesthesia Training: A Policy Proposal

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UNIFORM CLINICAL EVALUATION FOR VIDEO LARYNGOSCOPY IN NURSE ANESTHESIA TRAINING: A POLICY PROPOSAL

by

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ABSTRACT

At The University of Southern Mississippi's (USM) Nurse Anesthesia Program (NAP), no standardized clinical evaluation for video laryngoscopy (VL) use exists. To address the gap in standardized evaluation of VL, an evidence-based, objective structured clinical examination (OSCE) will be developed and proposed to the USM NAP. The intervention to this need is the evaluation of the OSCE and supporting documents by the panel of experts. The aim of the OSCE would be to teach SRNAs in a step-by-step process how to properly handle a video laryngoscope and the necessary techniques to ensure both patient and student safety (Wunder et al., 2014). The study of the intervention will be conducted through an anonymous survey with mixed methods, as the quantitative aspect would be data collected and the qualitative aspect would be feedback from the panel of experts on the OSCE. The responses yielded that 100% of participants agreed that the report of findings (Appendix E), OSCE template (Appendix D), and OSCE video presentation was sufficient for completion of the OSCE and the Qualitative analysis returned two out of five responses suggesting there was no adjusting or editing needed. From results gathered, this OSCE has the potential to decrease stress in the SRNA as they are entering the clinical setting as well as, provide standardized teaching and evaluation of VL that would instill proper handling and techniques necessary for student and patient safety.

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LIST OF ABBREVIATIONS

AANA	American Association of Nurse Anesthetists
APRN	Advanced Practice Registered Nurse
COA	Council of Accreditation
CRNA	Certified Registered Nurse Anesthetist
DL	Direct Laryngoscopy
DNP	Doctor of Nursing Practice
ETT	Endotracheal Tube
IHI	Institute for Healthcare Improvement
MAC	Macintosh
MDA	Anesthesiologist
NAP	Nurse Anesthesia Program
OR	Operating Room
OSCE	Objective Structured Clinical Examination
RN	Registered Nurse
RSI	Rapid Sequence Intubation
SRNA	Student Registered Nurse Anesthetist
USM	The University of Southern Mississippi
VL	Video Laryngoscopy

CHAPTER I – INTRODUCTION

Laryngoscopy is a technique used by critical care physicians, emergency medical technicians or paramedics, and in particular by anesthesia providers such as certified registered nurse anesthetists (CRNA) and anesthesiologists (MDA). Many surgeries today and patient conditions/comorbidities require tracheal intubation in order to provide adequate safety for the patient during their procedure. Direct laryngoscopy (DL) has been the cornerstone for airway management techniques by anesthesia providers for years. The introduction of video laryngoscopy (VL) has "been described as the most significant advancement in the way intubation is performed since the development of the laryngoscope in the 1940's" (Nagelhout & Elisha, 2018, p. 429).

As a practicing anesthesia provider, a CRNA must be competent and confident in their knowledge and skills of the anesthesia practice. Unfortunately, no one surgery or patient history or condition is alike. Some patients may present with abnormal conditions that may cause the CRNA to alter their practice in order to keep the patient safe. Surgical events such as airway problems or emergencies may arise that require a CRNA to act quickly and safely in order to keep the patient safe. When these difficult times emerge, the CRNA should be confident in delegating tasks and also be able to use the necessary equipment needed to overcome whatever the event necessitates. The anesthesia provider's basis of knowledge is vital in these situations, as it has the potential for poor outcomes if the provider has not operated or have any prior knowledge of how to use such necessary, life-saving equipment (Lewis et al., 2017).

Problem Description

Background

Before being able to practice as a CRNA, a Student Registered Nurse Anesthetist (SRNA), must complete the required didactic and clinical hours in order to graduate from an accredited Nurse Anesthesia Program (NAP). Didactic and clinical participation is important as students build a foundation of skills and knowledge that prepare the SRNA for actual patient care. As these necessary skills are being built upon, having a standardized method of assessment for basic didactic and clinical skills could be beneficial to both the NAP and the SRNA. As didactic work is usually evaluated through formal testing, Objective Structured Clinical Examinations (OSCE) build upon the didactic knowledge to help strengthen clinical skills for SRNAs (Wunder et al., 2014). These skills have the potential to standardize and evaluate the fundamentals of each NAP. Incorporating OSCEs, as proven by other specialties, can help evaluate clinical competencies as SRNAs transition from didactics and program simulations into clinical scenarios with patient care (Wunder et al., 2014).

The NAP at USM prepares SRNAs in both didactic and clinical applications. Students are evaluated on theoretical knowledge through formal examinations in didactic courses, presentations, and formal papers. Clinical knowledge and competency are evaluated by formative and summative evaluations which are to be completed by clinical preceptors. Currently, there are no individual or formal evaluations on particular clinical skills that may be necessary to the SRNA. According to the Policy and Procedures Manual for the USM NAP, the current curriculum includes two courses, NUR 837 and NUR 855, in which the OSCE could be utilized (NAP, 2020). NUR 837, Basic Principles

of Anesthesia Practice (NAP, 2020) course instills more of the structural aspects related to anesthesia. Topics related to the operating room (OR) structure, layout, and safety are covered. The basics of OR and anesthesia equipment are also taught. NUR 855, Clinical Correlation in Anesthesia (NAP, 2020), course supports the knowledge and builds upon fundamentals of basic principles while utilizing simulation scenarios to practice making evidence-based anesthesia care decisions (NAP, 2020).

Problem Statement

At The University of Southern Mississippi's Nurse Anesthesia Program, no standardized clinical evaluation for video laryngoscopy use exists. Without a standardized method of clinical evaluation on VL use, a student registered nurse anesthetists and patients under the care of student registered nurse anesthetists have the potential for poor outcomes for both the quality of patient care and students' educational experiences. To address the gap in standardized evaluation of VL, an evidence-based objective structured clinical examination will be developed and proposed to the USM NAP.

Significance of the Project

The goal of this project is to create an OSCE using portable VL for the USM NAP. The importance of an OSCE on VL would be to teach SRNAs in a step-by-step process how to properly handle a video laryngoscope and the necessary techniques to ensure patient safety. Without a standardized method of evaluation, the practicing SRNA or even CRNA, could miss crucial steps or make technical errors that have the potential to negatively affect patients and students. Patients may present with new or existing conditions that require the use of VL instead of DL. The anesthesia provider should have

the knowledge and capability to assess each patient and know when to use VL versus DL. Emergencies such as difficult airways may arise, and the anesthesia provider must act quickly in order to prevent adverse patient events. Now should not be the first time an anesthesia provider has used a video laryngoscope when these situations present. Having a standardized method and evaluation prepares the anesthesia provider for these times so that they can be quick to act upon and adapt to overcome these adverse events. By incorporating this OSCE in the first year of didactic work in the NAP, it could prepare the novice SRNA on proper use and safe handling of a VL before stepping into the clinical setting with patient care (Wunder et al., 2014).

Available Knowledge

Laryngoscopy Technique

Tracheal intubation is a process of using instruments to obtain a view of the patient's vocal cords, passing an endotracheal tube (ETT) through the glottic opening into the trachea, and securing the tube inside the trachea. "Flexion of the neck and extension of the atlanto-occipital joint, or sniffing position, allows for proper alignment of the oral, pharyngeal, and tracheal axis" (Nagelhout & Elisha, 2018, p. 410). DL primarily uses this technique to achieve a direct view from the providers' eye to the patient's glottic opening or vocal cords. Both DL and VL techniques use the same anatomical landmarks as a reference guide. DL uses a handle that has two types of blades that directly attach it. The Macintosh (MAC) blade has a curved angle and proper placement of the tip of the blade is placed in the vallecula, where the Miller blade is a straight blade and proper placement of the tip of the blade is posterior or under the epiglottis. VL uses an indirect view of the larynx, in real-time. Different brands and types of VL devices are available. The

anatomical structures are viewed on an external viewing screen, no matter what brand device is used (Nagelhout & Elisha, 2018).

Patients may have coexisting factors that require a provider to alter or create a new anesthetic plan in order to keep the patient safe. Patients with cervical spine disease, rheumatoid arthritis, ankylosing spondylitis, and neck tumors may severely decrease neck range of motion. Aligning the three axes by neck flexion and extension of the atlanto-occipital or placing the patient in the *sniffing* position, creates the best glottic view for DL. With this decrease in range of motion, the patient cannot be placed in a true sniffing position and the glottic view will be decreased. Trying to force a patient into a sniffing position or overextension of the neck to improve the glottic view could cause cervical spine trauma (Nagelhout & Elisha, 2018). The *GlideScope*® video laryngoscope is a better choice than DL for situations like these with c-spine concerns, as the head and neck can be kept in a more natural or neutral position for intubation (Nagelhout & Elisha, 2018).

GlideScope® Video Laryngoscope

The *GlideScope*® was the first widely available video laryngoscope. One version has a single-use system called *GlideScope® AVL*. This system has a video monitor on a portable stand which allows you to position the monitor to where the provider can best visualize it. Unlike DL, the provider will majorly use the screen to visualize anatomic structures and pass the ETT. The *GlideScope*® has single-use Stats that are disposable. There are six sizes that range from preterm infants to large adults which allows the provider to tailor this system to each patient. These Stats are curved similar to the MAC blade and are one fluid piece that slides over the video baton. A cable from the screen

attaches the top of the handle or video baton. A flexible tip camera is at the other end of the baton. The entire baton/camera tip is inserted into the plastic stat and interlocks to hold the disposable Stat in place. The *GlideScope*® system also requires the provider to use the *GlideRite* Stylet in the ETT to aid with intubation. This stylet also inserts into the ETT but is a hard/rigid, metal stylet that is in a preformed shape. These stylets must be used to aid in inserting the ETT into the mouth and directing it toward the vocal cords because of the angle of the *GlideScope*® and the limited space available in the patient's mouth (Verathon®, 2020).

A series of steps recommended by the manufacturer must be followed for proper functioning and usage of the *GlideScope*® video laryngoscope and will be explained. The provider observes the patient insert the handle/camera/stat into the mouth until the camera tip is no longer seen. The provider now observes the video screen to identify anatomy. Advance the stat/camera until the view of the glottis is obtained. Since the Stat is shaped like the MAC blade, the tip sits in the vallecula. Advancing or retracting the camera could help get a better view, but the provider may have use lifting technique as with DL. Positioning the view of the glottis on the top third of the screen is best. The provider must look back at the patient's mouth and insert the ETT with the *GlideRite* stylet partial into the mouth. The video screen is used again to visualize the ETT and glottis. By using the handle on the stylet, direct and advance the ETT through the vocal cords by pressing the tube off of the stylet a few centimeters at a time. The goal is to not advance the stylet through the vocal cords and visualize the ETT passing through the vocal cords. Once the balloon cuff is through the cords, hold the tube and finish removing

the stylet. Leave the video laryngoscope in place so that you can verify that the ETT did not move while removing stylet and then secure the ETT. (*Verathon*®, 2020).

Objective Structured Clinical Examination

An OSCE, or Objective Structured Clinical Examination, is a clinical or performance-based examination that tests the SRNAs knowledge, clinical skills, and how they incorporate their knowledge into practice. Traditionally, OSCEs are presented as a series of stations, where the competence of a skill area is assessed at each one. While at these stations, the student will be exposed to a set of examiners for each station, and the standards expected of the skill are specified ahead of time by a blueprint or a template. According to Harden et al. (2016), there are eight components or features illustrating an OSCE. Harden et al. categorized those components as "eight P's*"* (p. 9), of which each are listed hereafter; "performance assessment; process and product; profile of learner; public assessment; participation of staff; pressure for change with poor overall class performance" (Harden et al., 2016, p. 9); and "pre-set standards of competence" (Harden et al., 2016, p. 10). The OSCE has shown a positive impact on education and its effects are acknowledged by many. The OSCE stimulates the learner to develop the necessary clinical skills to achieve competency. Harden et al. (2016) also mentions, that using an OSCE as a diagnostic tool has the potential to identify flaws related to the program and the students, in which both can be improved on.

According to Ballister (2018), the Council on Accreditation (COA) of Nurse Anesthesia Educational Programs, requires the incorporation of simulation training within the program's curriculum, in order to comply with standards set forth for the training of doctoral prepared nurse anesthesia students. Numerous training aides and

educational preparations could theoretically be used for simulations with hopes to enhance the SRNAs knowledge and skill set. Simulations also allow SRNAs to think, act, and carry out these skills in a harmless environment before involving care of a real-life patient. “The OSCE is one method educators can incorporate to demonstrate compliance with the COA standard because it can be used for both skill reinforcement and evaluation of SRNAs in multiple areas throughout the curriculum” (Ballister, 2018, p. 60).

OSCE creation was credited to Dr. Harden and associates back in the 1970’s (Onwudiegwu, 2018). Today, OSCEs are becoming more popular in other medical subsidiaries, rather than just medical schools. Wunder et al. (2014), mentions that OSCEs are being utilized in other countries such as a university in the UK for a nurse practitioner program and also in the Israel for national certification boards. According to an interview with Dr. Mary Jane Collins, DHA, CRNA, (personal communication, April 2, 2020), the Nurse Practitioner Program at USM routinely utilizes the OSCE format in their curriculum.

Standardized Method of Assessment

A standardized method of assessment for VL has the potential to be beneficial to both the NAP and the SRNA. The OSCE could be implemented by the NAP as a method to enhance clinical performances of the SRNA. The OSCE could also enhance the simulation aspects of a curriculum in providing dependable and consistent teaching to current and future SRNAs of the NAP. Simulations have been utilized in courses to help transition what is taught didactically to hands-on skills (Wunder et al., 2014).

The OSCE provides a standardized, step by step process of teaching VL to the SRNAs. By implementing the OSCE as a standardized method of assessment, it would

help the SRNA to not miss critical steps during VL or improperly handle the equipment that could potentially produce negative consequences. OSCEs also allow the SRNA to have individualized instruction that helps develop these proper techniques for safe usage. “The ability to first practice what is taught and then be tested in a standardized fashion is a unique attribute of the OSCE” (Wunder et al., 2014, p. 420). While simulation practice is much different than caring for real-life patients, the OSCE can prepare the SRNA for clinical experiences and allow them to work through difficulties without serious consequences. Implementing an OSCE for VL could provide a reliable and easy way to replicate teaching and evaluation methods due to its standardized method of assessment. As Ballister (2018) mentions when developing an OSCE, integrating uniformity and processes within the design are important elements as it ensures that all students receive equal guidance throughout their training.

Formative and Summative Evaluations

According to Wunder et al. (2014), an OSCE is a “gold standard for practitioner competency assessment” (p. 420). An OSCE can be used as both summative and formative evaluations for the SRNA. Summative evaluations usually take place in the classroom following a lecture or instruction in the form of tests or examinations. The summative type may evaluate the SRNA at intervals during the semester and is based on the knowledge acquired. The OSCE will provide a template that can be used as a checklist for the summative evaluation of the SRNA (Wunder et al., 2014).

A formative evaluation assesses the ability of the learner to take their acquired knowledge and put it into practical use or clinical skills for the SRNA. The formative type of evaluation provides feedback on the OSCE performance which can help identify

objective accomplishment or recognize areas that need improving upon. Implementing an OSCE would evaluate the SRNAs knowledge of VL and how they interpret the information into clinical practice, and the competency of both.

First Pass Success and New Users

As mentioned above, laryngoscopy is a skill many different providers will use and has the potential to be intimidating for anyone performing these skills for the first time. Airway anatomy differs in every person. According to a pilot study, anatomical airway structures may not be as easily identified by a beginner SRNA, therefore, may have low success rates for endotracheal intubation. "*GlideScope*® video laryngoscopy improves the view of the glottic opening compared with direct laryngoscopy and may improve the success rate for laryngeal intubation" (Wands & Minzola, 2015, p. 403). The optimal choice for new providers or beginner SRNAs who have never performed laryngoscopy on a real patient should consider using VL initially. As described, the *GlideScope*® VL provides a real-time, indirect view on an external viewing screen. This real-time view will allow a preceptor to see exactly what the student sees and guide the student through the entire process (Lewis et. al., 2017). With DL, the preceptor can only see what is going on outside the patient's mouth and cannot see any anatomical structures that the student sees or view the ETT passage through the vocal cords (Low et al., 2008).

An observational study found compared the first pass success rate of DL with the *GlideScope*® VL. The results of the first pass intubation attempt showed an 80% success rate with DL, 93% success rate with a *GlideScope*® VL, and a 99% success rate using a *GlideScope*® after the initial attempt failure of DL (Ibinson et al., 2014). First pass success can be influenced by patient factors such as Mallampati score, mouth opening,

cervical spine mobility, thyromental distance, incisor distance, dentition, and body mass index to name a few. These factors are also considered difficult airway characteristics (Ibinson et al., 2014).

Potential Negative Consequences

As professionals in the medical field, it is always difficult to hear about or experience events that impact patients negatively. The American Association of Nurse Anesthetists (AANA) Foundation has a *Closed Claims* research team that investigates and researches adverse events that potentially classify CRNAs as the source or contributing factor to the adverse event. One claim involved a 36-year-old female having a procedure done under local anesthesia at a individual clinic. After intravenous medications were administered and the patient was positioned, she began having difficulties. A disposable capnography device was used to confirm the appropriate placement of the ETT after the first attempt. The color on the capnography device indicated correct placement, yet the patient continued to decline. The CRNA was unable to ventilate for the patient and unsuccessful at intubation after multiple failed efforts. Emergency medical services arrived, placed an emergency airway, and transferred the patient to the emergency room. Unfortunately, the patient's condition worsened and quickly passed after arrival to the emergency room. In the discussion about the claim, one statement mentioned that "the facility did not have the equipment needed to manage a difficult airway" (Hranchook et al., 2018, p. 314). If the facility would have had a video laryngoscope, the patient would have had increased chances of being intubated after the first attempt with visual confirmation of correct placement. If the CRNA was not trained or knew how to use the video laryngoscope equipment, then multiples attempts could

have been attempted again or patient injury from misuse. Another claim in the article described an event that involved a failed intubation resulting in absent breath sounds. After returning to the OR, the placement of the ETT was assessed by a fiberoptic scope and was confirmed to be in the esophagus. Here again, where time is critical, having a video laryngoscope could have improved the success of the initial intubation. With the implementation of this OSCE, proper training and knowledge would already be instilled before real-life situations, as these mentioned, that could help prevent these adverse events (Hranchook et al., 2018).

Another concern for both DL and VL is a patient injury during tracheal intubation. Injuries can include but are not limited to bruising or rupturing of lips; chipping or knocking out a tooth; and mucosal injuries of tonsils, oropharynx, and tongue. A randomized, blind clinical study was performed, at a large teaching institution, comparing injury results of DL versus *GlideScope*® VL. A total of 155 intubations were observed and divided into groups resulting in 78 participants in the *GlideScope*® group and 77 in the DL group. Out of the total 155 observations, 27 injuries, both minimal and moderate, were documented. The *GlideScope*® group contributed to 16 of those injuries and the DL group contributed to 11 injuries (Scholtis et al., 2017). Barash et al. (2017), mentioned that blind manipulation of the ETT as it enters the airway but not yet visualized by the video screen is directly related to inpatient injury while using the *GlideScope*®. Paying attention to the patient's mouth as you introduce the ETT, making sure the *GlideRite* stylet is no longer than the ETT of choice, and maintaining the ETT midline will help to decrease the incidence of injury (Barash et al., 2017).

Another potential negative consequence is related to SRNA. Learning new information and the acquired skills that follow can be intimidating, especially when errors can be detrimental to others. The preceptor can only see what is going on outside the patient's mouth and cannot see any anatomical structures that the student sees. Judgment and actions are solely based on the student's intuition and knowledge. This poor judgment could result in missed intubations, injuries, and ultimately reducing student confidence in intubation skills. Using VL allows a preceptor to see exactly what the student sees and guide the student through the entire process. Data from a seminal article showed that students in the VL study group had more successful attempts and were more confident of the success of their tube placement than the control group with DL (Low et al., 2008).

Conclusion

As mentioned above, there is a demand for a standardized assessment for video laryngoscope usage. This standardized method of assessment could be accomplished through creating an OSCE. Having this OSCE implemented into the USM NAP could help build upon the programs simulation courses and provide a knowledge base for SRNAs before real-life situations. Having this standardized method of assessment as a knowledge foundation could help SRNAs and CRNAs to be more prepared to intervene when such difficulties arise.

Rationale

Framework

The Donabedian Model, named after Avis Donabedian, has been used to evaluate and theorize healthcare for years now. According to the Boston University School of

Public Health (2016), this model consists of three steps including structure, process, and outcomes. This model in a sense can be used as a framework for this OSCE. The structure itself is the development and implementation of the OSCE. The process is the template used for instruction to the students and how the student performs the OSCE. Outcomes would be the completion of the OSCE by the student and the formative and summative evaluations mentioned previously. While this model usually assesses healthcare and its outcomes with patients, this framework can help evaluate the effectiveness of this OSCE (Boston University School of Public Health [BUSPH], 2016).

IHI Triple Aim

The Institute for Healthcare Improvement (IHI) developed a Triple Aim framework as an approach to optimize health systems' performance in America. The three aspects of the Triple Aim are; "Improving the patient experience of care, improving the health of populations, and reducing per capita cost of health care" (Institute for Healthcare Improvement [IHI], 2020, n.p.). The creation and implantation of this OSCE may indirectly follow and show the improvement of these aims in a beneficial way. The OSCE on VL itself provides a standardized method of assessment to SRNAs before being used in practice on real patients. By incorporating the use of video laryngoscopes into practice, the SRNA could have better success rates of tracheal intubation on the first attempt which could improve the patient experience. Also, one could improve the health of people by the use of video laryngoscope in difficult airway algorithms and resuscitation efforts, especially when these difficulties are known. One could also use video laryngoscopes to reduce the per capita cost of health care by reducing the amounts of intubations attempted on the first try. With multiple intubation attempts, the patient

could be severely injured, or death could occur if intubation is essentially unsuccessful or patient condition deteriorated too far in the process (Lewis et. al., 2017).

DNP Essentials

The DNP Essentials outline fundamentals and proficiencies that are required in all DNP degrees and are the core to all advanced nursing practice roles. There are eight core essentials that are the foundation of all DNP programs regardless of specialty or function. Listed below are the eight DNP Essentials as presented by AACN (2006):

I. Scientific Underpinnings for Practice;
II. Organizational and Systems Leadership for Quality Improvement and Systems Thinking;
III. Clinical Scholarship and Analytical Methods for Evidence-Based Practice;
IV. Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care;
V. Health Care Policy for Advocacy in Health Care;
VI. Interprofessional Collaboration for Improving Patient and Population health Outcomes;
VII. Clinical Prevention and Population Health for Improving the Nation's Health; and
VIII. Advanced Nursing Practice (American Association of Colleges of Nursing [AACN], 2006, pp. 8-17)

The most integral essentials to this project would be II, IV, and VII. Development of an Objective Structured Clinical Examination on using a *GlideScope*® video laryngoscope represents "Essential II: Organizational and Systems Leadership for Quality

Improvement and Systems Thinking" (AACN, 2006, p.10), as evidenced by standardized clinical evaluation tool for the NAP. The project was devised from product manufacturing information and evidence-based research of the effectiveness of VL inpatient care, which incorporates "Essential IV: Information Systems/Technology, and Patient Care Technology for the Improvement and Transformation of Health Care" (AACN, 2006, p.12). Lastly, the implementation and use of an OSCE provides an enhanced clinical performance while reducing errors in procedural steps and techniques necessary for patient safety would incorporate "Essential VII, Clinical Prevention and Population Health for Improving the Nation's Health" (AACN, 2006, p.15). Please refer to the DNP Essentials table in Appendix A.

Specific Aims

Purpose of the Project

At The University of Southern Mississippi's Nurse Anesthesia Program, no standardized clinical evaluation for VL use exists. Without a standardized method of clinical evaluation of VL use, SRNAs, and patients under the care of SRNAs have the potential for poor outcomes. To address the gap in standardized evaluation of VL, an evidence-based objective structured clinical examination will be developed and proposed to the USM NAP. The intervention to this need is the evaluation of the OSCE and supporting documents by the panel of experts. The aim of the OSCE would be to teach SRNAs in a step-by-step process how to properly handle a video laryngoscope and the necessary techniques to ensure both patient and student safety (Wunder et al., 2014). The study of the intervention will be conducted through an anonymous questionnaire and support from a chosen panel of experts. The population would include the chosen panel

of experts. This research design will include a survey of both mixed methods as the quantitative aspect would be data collected and the qualitative aspect would be feedback from the panel of experts on the OSCE. Variabilities could include but are not limited to, funds, access to simulation laboratory and VL equipment, panel of expert advice or participation, student involvement, and effectiveness of OSCE.

Summary

There is a need for a standardized method of assessment on the use of portable video laryngoscopes in order to prevent inconsistent training and poor knowledge that could lead to the misuse of equipment and poor patient outcomes. Currently, there is no standardized teaching or evaluation on how to use VL. Without a standardized method, SRNAs could miss critical steps of the process or make errors during the process that could ultimately harm the patient. Incorporating an OSCE for VL would provide a step-by-step process to teach SRNAs the proper technique and handling of video laryngoscopes.

Chapter II will discuss the methodology and how the OSCE will be developed. The context as to the location, staffing, and teaching status of the institution will be discussed. A description of the intervention would be described and how to prepare for the policy proposal.

CHAPTER II – METHODS

At The University of Southern Mississippi's Nurse Anesthesia Program, no standardized clinical evaluation for VL use exists. Without a standardized method of clinical evaluation on VL use, SRNAs, and patients under the care of SRNAs have the potential for poor outcomes for both the quality of patient care and student's educational experiences. To address the gap in standardized evaluation of VL, an evidence-based objective structured clinical examination was developed and proposed to the USM NAP.

Context

The University of Southern Mississippi is a four-year public institution. The Nurse Anesthesia Program is part of the College of Nursing and Health Professions and the School of Leadership and Advanced Nursing Practice. The program is a face to face, 36-month plan of study resulting in 114 semester hours of credit. The NAP currently admits 20 students to a cohort every January and graduation occurs in December at the end of the three-year plan. The 1st year of study is dedicated to didactic study, while the 2nd and 3rd years consist of didactic and clinical experience. (NAP, 2020). There are four NAP faculty members that are dedicated to nurse anesthesia instruction. There is a simulation laboratory on campus that has two simulation coordinators dedicated to operating and conducting simulations. The OSCE will be available to faculty and students in different forms. The OSCE and video demonstration will be housed in an electronic library for the NAP and a print version of the OSCE will be available in the simulation laboratory (M. J. Collins, DHA, CRNA, personal communication, April 2, 2020).

As mentioned previously mentioned, learning new information and the acquired skills that follow can be intimidating, especially when errors can be detrimental to others. NAPs utilize the use of simulations in order to better prepare students entering the clinical setting by providing scenarios to practice real life situations without detrimental complications (Ballister, 2018). Referring back to the Policy and Procedures Manual for the USM NAP, the NUR 387, Basic Principles of Anesthesia Practice (NAP, 2020), and NUR 855 Clinical Correlation in Anesthesia (NAP, 2020), could be potential courses to incorporate the OSCE. Here, the OSCE would be able to evaluate these clinical competencies as the student transitions from didactic work into the clinical setting (Wunder et.al., 2014).

The NAP also has a strong motivation for student success at USM. There is both internal and external support for nurse anesthesia graduates to be exemplary in the field of anesthesia and be able to overcome any adversity they encounter. Internally, there is a culture supportive of improvement by the faculty. The Council of Accreditation ensures that the NAP meets its requirements by performing audits. The NAP faculty are frequently trained on simulation and craft modules to stay up to date with current evidence-based policy and procedures. There is also external support from the community by CRNAs and from the state by the Mississippi Association of Nurse Anesthetists (MANA) (M. J. Collins, DHA, CRNA, personal communication, April 2, 2020).

Intervention

1. IRB approval was obtained from USM.
2. An OSCE for VL was prepared based on evidence-based practice, manufacturer guidelines, and peer-reviewed literature.
3. A video presentation was recorded based on the identified steps in the OSCE for VL.
4. A panel of 5 experts was selected and represented relevant stakeholders surrounding the education of VL.
5. The OSCE was submitted for approval from the DNP Project Chair and Committee at USM.
6. Submitted approved OSCE, video OSCE presentation, and report of findings with references to the panel of experts by email. The panel was asked to evaluate the OSCE document and presentation via an anonymous survey through Qualtrics©. There were no repercussions for non-participation.
7. Responses from the panel were recorded and organized into a table. Electronic responses are stored in a password-protected laptop computer. Any printed resources were locked in a drawer.
8. Analysis of feedback was performed, and results determined that the OSCE did not need to be altered. If any were needed, alterations would have reflected said feedback if supported by evidence-based literature, manufacturer's guidelines, and peer-reviewed literature.
9. OSCE was submitted to the DNP Project Committee for approval.

10. Presented approved OSCE document, OSCE video recording, and executive summary to the USM NAP Faculty for consideration of adding it to their current curriculum.
11. Disseminate research/OSCE at USM Scholarship Day
12. Upon completion and conclusion of the project, all electronic data will be deleted from the computer, and the trash bin will be emptied. Physical data will be shredded.

A panel of 5 experts were chosen to participate in evaluating the OSCE. Not all panel experts came from the same specialty so that each one can evaluate different, vital parts of this OSCE. CRNAs, who have also been clinical preceptors for NAP students, were chosen for their knowledge and skills related to both clinical settings/events, VL, and student mentoring. A USM School of Leadership and Advanced Nursing Practice faculty member was chosen to evaluate the structure of the OSCE, as OSCEs have already been implemented into their program. Also, USM NAP faculty members were chosen, as they are involved in student success through educating and testing/evaluation. One faculty member in particular is a stakeholder in the development of this OSCE as they are the committee chair for this project.

Measures

The OSCE has the potential to provide an evaluation tool for the NAP to help ensure SRNAs are prepared for the clinical setting and also has the potential to help the SRNAs to be more confident in these necessary skills needed prior to clinicals. Each panel of expert participants was provided all necessary information related to the OSCE such as a Report of Findings, OSCE template, demonstration video, and an evaluation

tool via Qualtrics©. The survey forwarded to the panel of experts was individualized for this OSCE and the results were incorporated into a table. The survey questions were composed with the intent of providing feedback on uniformity and clearness related to both the OSCE and the SRNA.

1. Were the materials (Report of Findings, Template, & Demonstration Video) sufficient for completion of the OSCE?
2. Was the equipment provided and the setting adequate for learning?

Questions one and two were designed to evaluate the structure of the OSCE. Question one aided in determining if the information provided was clear, adequate, and easily understandable. Question two aided in determining if the appropriate equipment and materials provided aligns with the available knowledge of the OSCE and evaluate if the setting was appropriate.

3. Do you think the OSCE has the potential to prepare the SRNA for the clinical setting and increase confidence in performance?

Questions three was designed to evaluate the effectiveness of the OSCE on the SRNA. The question aided in determining if the SRNA had gained the appropriate knowledge and skills to perform VL confidently while being able to transition from didactic studies into the clinical setting.

4. Does the OSCE preparation and presentation reflect doctoral-level work?

Question four was designed to aid in determining if the complexity of this OSCE is suited to the required level of work required for doctoral education.

5. Based on the provided OSCEs and your personal experience, how could the OSCE be improved?

Question five was designed to elicit feedback from the panel on the OSCE. This question provided an open opportunity for feedback in hopes of enhancing the OSCE. This question also allowed the panel to elaborate answers related to questions 1-4. Please refer to Table 1 for the panel of experts survey and responses.

Analysis

An anonymous survey was sent to a panel of experts to provide feedback on the project. Data and feedback from the survey of the panel were organized into a table, noted in the next chapter. The survey represented both quantitative and qualitative analyses. Questions 1-4 were designated as yes or no questions and yielded quantitative feedback. The quantitative results were further expressed in percentages. Question five had the potential to yield qualitative data as it gives the panel an opportunity for open feedback. Analysis of the qualitative data would determine if there were any common themes in the feedback from the panel. This feedback, through the evaluation tool, can be used in order to modify the OSCE for better outcomes, but results showed no modifications were necessary.

Ethical Considerations

This OSCE on VL was developed with hopes to prevent the potential poor outcomes for both the quality of patient care and student's educational experiences. The OSCE was presented to the USM NAP administration for consideration of integrating this OSCE into their current curriculum. A potential ethical consideration would exist is if USM accepts the OSCE and the OSCE is not administered uniformly among the cohorts or professors. For instance, there could potentially be an instance of two levels of education. This instance has the potential to occur if one faculty member incorporates the

OSCE into their syllabus and teaching methods, and another faculty member chooses not to incorporate the OSCE and instead teach by their own methods. By presenting the OSCE for adoption into the curriculum at the program level, this adoption could override the potential negligence and provide one standard level of education for the entire program. In conclusion, there are no conflicts of interest, and the OSCE was submitted for IRB oversight in determining potential ethical considerations.

Summary

This chapter described the institution, program layout, and how the OSCE could be incorporated into the program. The intervention was listed out to show how this policy proposal was conducted. Additional information regarding the panel of experts and the survey questions used were explained. Ethical considerations were also evaluated and showed no conflicts of interest, as mentioned above.

Chapter III will discuss the results of the intervention and how they were obtained. The data was collected and arrayed into a table where analysis was conducted for any common themes. Process measures and outcomes will be discussed last to determine if the intervention and study of the intervention have answered the gap in standardized evaluation of VL.

CHAPTER III - RESULTS

At The University of Southern Mississippi's Nurse Anesthesia Program, no standardized clinical evaluation for VL use exists. Without a standardized method of clinical evaluation on VL use, SRNAs, and patients under the care of SRNAs have the potential for poor outcomes for both the quality of patient care and students' educational experiences. To address the gap in standardized evaluation of VL, an evidence-based OSCE will be developed and proposed to the USM NAP. The intervention to this need is the evaluation of the OSCE and supporting documents by the panel of experts. The OSCE would aim to teach SRNAs in a step-by-step process how to properly handle a video laryngoscope and the necessary techniques to ensure both patient and student safety (Wunder et al., 2014). The study of the intervention will be conducted through an anonymous questionnaire and support from a chosen panel of experts. The population would include the chosen panel of experts. This research design will include a survey of both mixed methods as the quantitative aspect would be data collected and the qualitative aspect would be feedback from the panel of experts on the OSCE.

Following the proposed methodology, project participants were surveyed, and results were analyzed with no changes in the proposed process. A personal email invitation was sent to each panel expert. The invitation included an informed consent along with the OSCE video presentation, OSCE template, and report of findings that were components to be evaluated by the expert. A survey link was also included in the invitation which directed the expert to an anonymous evaluation survey tool that was created by Qualtrics©. Qualtrics© anonymously provided each survey response. The data was collected and arrayed into Table 1, where it was analyzed for any common themes

for both quantitative and qualitative analyses. There were five experts chosen for an email invitation and fortunately, all five experts responded with feedback. The responses yielded 100% consensus from the participants that the report of findings, OSCE template, and OSCE video presentation was sufficient for completion of the OSCE. One hundred percent of participants agreed that the equipment provided, and the setting was adequate for learning. Also, 100% of the participants agreed that the OSCE has the potential to prepare the SRNA for the clinical setting and increase performance confidence. Lastly, 100% of the participants established that the preparation and presentation of the OSCE reflected doctoral-level work. The qualitative analysis returned two out of five responses suggesting that there is no adjusting or editing needed.

Table 1

Panel of Experts Survey and Responses

Question	Panel 1 Response	Panel 2 Response	Panel 3 Response	Panel 4 Response	Panel 5 Response
1. Were the materials (Report of Findings, Template, and Demonstration Video) sufficient for completion of the Objective Structured Clinical Exam?	Yes	Yes	Yes	Yes	Yes
2. Was the equipment provided and the setting adequate for learning?	Yes	Yes	Yes	Yes	Yes
3. Do you think the OSCE has the potential to prepare the SRNA for the clinical setting and increase confidence in performance?	Yes	Yes	Yes	Yes	Yes
4. Does the OSCE preparation and presentation reflect doctoral-level work?	Yes	Yes	Yes	Yes	Yes
5. Based on the provided OSCEs and your personal experience, how could the OSCE be improved?	The OSCE and video were very clear and met objectives	Looks good!			

Process Measure and Outcomes

The survey questions were developed to provide an objective criterion for grading the OSCE. The data collected from the survey would determine if the intervention and

study of the intervention have answered the gap in the standardized evaluation of VL. The data showed 100% consensus from the participants that this OSCE for VL was sufficient to address this gap. This OSCE would teach SRNAs in a step-by-step process how to properly handle a video laryngoscope and the necessary techniques to ensure both patient and student safety, while also strengthening the SRNAs clinical skills and confidence in those skills. This OSCE would also provide a formal and standardized evaluation, for the USM NAP, of individual SRNAs skills of VL and could enhance those courses involved with the simulation aspects of the curriculum.

Summary

This chapter discussed the results to the intervention. The data from the survey was constructed into a table and results were examined for common themes. The findings suggest that this OSCE would be satisfactory in addressing the gap of standardized evaluation and the potential impacts will be mentioned in Chapter IV. There will be a discussion of the findings and a comparison of the outcomes. Limitations to the generalizability of the work are also revealed and how each limitation will be addressed.

CHAPTER IV – DISCUSSION

Summary

The data from the panel of experts was constructed into a table for quantitative and qualitative analysis (Table 1). The measures and outcomes showed 100% agreeance from the participants that the OSCE video presentation, report of finding, and OSCE template addressed the gap mentioned. The OSCE template included a case scenario, a list of equipment and process steps, images, a manufacturer video on the *GlideScope*® equipment, a debriefing form, and the assessment form. Based on the responses, there was no adjusting or editing needed for the OSCE. The data shows that the materials provided were sufficient to complete the OSCE and the equipment/setting was adequate. The data similarly showed that the OSCE preparation and presentation reflected doctoral work and also had the potential to prepare SRNAs for the clinical setting.

The panel of experts evaluated and provided feedback for the OSCE which was a contributable strength to this OSCE. The CRNA participants provide a practical clinical perspective as they utilize video laryngoscopy in clinical practice. The CRNA participants are also familiar with evidence-based practice as demonstrated by their positions as professors of nurse anesthesia and authorship in peer-reviewed journals. The APRN professor has extensive knowledge of the creation and delivery of the OSCE format, as evidenced by the historical use of the modality. Evaluation of the OSCE and supporting documents by this knowledgeable panel of experts lent vital strength for the development and adaptation into the NAP.

Interpretation

Intervention and Comparison of Outcomes

The outcomes and data suggest that the OSCE for VL would be an appropriate intervention to address the gap in standardized evaluation of VL in the USM NAP and has the potential to prevent poor student and patient outcomes from improper handling/techniques and poor clinical skills or knowledge of VL. The OSCE would not only provide a resource to students that does not currently exist but also provide faculty and students a standardized system and expectations of clinical grading. The evaluation of the OSCE and supporting documents yielded positive results, but it is difficult to compare them to similar projects, as minimal literature on this topic exists. There were no differences in observed and anticipated outcomes as based on EBP and there were no adjustments suggested by the panel. The project and results relate to the Donabedian Model framework as evidenced by, the survey results of the panel of experts, which suggest that structure or OSCE and the OSCE process can yield positive outcomes for the USM NAP, the SRNA, and the patient (BUSPH, 2016).

Potential Impact

The OSCE, supporting documents, and the video demonstration have the potential to make a positive impact on USM NAP SRNAs and patient care outcomes. The OSCE could contribute to the beginning of an OSCE library, where future OSCEs could be added to and build a database to be used in the future curriculum. The OSCE has the potential to decrease the stress for SRNAs as they prepare to enter the clinical setting. The OSCE also has the potential to spread and impact other healthcare settings. Examples could be but are not limited to, specialties/providers with the ability to intubate and deal

with emergency airways, incorporate into job orientation objectives, and be used for continuing education.

The development of this OSCE for VL has the potential to decrease any misunderstanding between faculty and students. The OSCE will provide a standardized procedure and expectations that are known to both the faculty and students, which allows the students to know what is expected of them and there will be a uniform grading system. The OSCE video demonstration has the potential to reinforce the written materials and provide another avenue of teaching. Students are able to learn by different teaching methods and at their own pace while developing a good understanding and skill set before performing the skill in front of an instructor.

Limitations

The generalizability of the work could be influenced by potential limitations. The small size of the panel of experts could be a possible consideration. In efforts to offset this potential limitation, panel members were sought who were actively involved and highly motivated with the request of this OSCE for VL. The Advanced Nursing Practice professor has a history with OSCE's but is not anesthesia related, therefore will be unbiased toward the student and may have less knowledge or how to use VL.

Another limitation could be time constraints. The panel of experts are practicing professionals. Additional questions in the survey could provide additional qualitative feedback but would also take more time to complete. The expert might not participate if an extensive amount of their time is needed. The survey was condensed to cover the most pertinent objectives, in order to gain maximum quality feedback with a minimal amount of questions with respect to the experts' time.

Conclusion

In conclusion, the work of this OSCE, supporting documents and video demonstration, could be useful to both the SRNA and the USM NAP. If accepted by the NAP, the OSCE could be incorporated into both clinical and didactic curriculum and could be sustained by creating and adding it to an OSCE library for the NAP. As previously stated, the OSCE, supporting documents, and video demonstration have the potential to spread and impact other healthcare settings such as specialties/providers with the ability to intubate and deal with emergency airways, be incorporated into job orientation objectives, and be used for continuing education. This OSCE has the potential to decrease stress in the SRNA as they are entering the clinical setting as well as, provide standardized teaching and evaluation of VL that would instill proper handling and techniques necessary for student and patient safety.

APPENDIX A – DNP Essentials

DNP Essentials	Clinical Implications
ONE: Scientific Underpinnings for Practice	Need for a standardized method of assessment for *GlideScope*® video laryngoscopes.
TWO: Organizational and Systems Leadership for Quality Improvement and Systems Thinking	Objective Structured Clinical Examination on using a *GlideScope*® video laryngoscope.
THREE: Clinical Scholarship and Analytical Methods for evidence-Based Practice	Use of research synthesis and analysis for recognition of pertinent data.
FOUR: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care	The goal of this project is to provide a standardized method of assessment for *GlideScope*® video laryngoscopy. This project was devised from product manufacturing information and evidence-based research on the effectiveness of video laryngoscopy inpatient care.
FIVE: Health Care Policy for Advocacy in Health Care	This project advocates a consistent learning/teaching process to ensure necessary steps are taken that result in better patient outcomes when using *GlideScope*® video laryngoscopy.
SIX: Interprofessional Collaboration for Improving Patient and Population Health Outcomes	This project is aimed to provide a standardized learning/teaching method to enhance clinical performances with video laryngoscopy.
SEVEN: Clinical Prevention and Population Health for Improving the Nation's Health	The implementation and use of an OSCE provide enhanced clinical performance while reducing errors in procedural steps and techniques necessary for patient safety.
EIGHT: Advanced Nursing Practice	Design, implement, and evaluate therapeutic interventions of the OSCE

APPENDIX B –IRB Approval Letter

Office of
Research Integrity

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

118 COLLEGE DRIVE #5125 • HATTIESBURG, MS | 601.266.6576 | USM.EDU/ORI

NOTICE OF INSTITUTIONAL REVIEW BOARD ACTION

The project below has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services regulations (45 CFR Part 46), and University Policy to ensure:

- The risks to subjects are minimized and reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered involving risks to subjects must be reported immediately. Problems should be reported to ORI via the Incident template on Cayuse IRB.
- The period of approval is twelve months. An application for renewal must be submitted for projects exceeding twelve months.
- FACE-TO-FACE DATA COLLECTION WILL NOT COMMENCE UNTIL USM'S IRB MODIFIES THE DIRECTIVE TO HALT NON-ESSENTIAL (NO DIRECT BENEFIT TO PARTICIPANTS) RESEARCH.

PROTOCOL NUMBER: IRB-20-223
PROJECT TITLE: Uniform Clinical Evaluation for Video Laryngoscopy in Nurse Anesthesia Training: A Policy Proposal
SCHOOL/PROGRAM: School of LANP, Leadership & Advanced Nursing
RESEARCHER(S): Kristen Yelverton, Mary Jane Collins

IRB COMMITTEE ACTION: Approved
CATEGORY: Expedited
7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

PERIOD OF APPROVAL: April 24, 2020

Donald Sacco Jr.

Donald Sacco, Ph.D.
Institutional Review Board Chairperson

APPENDIX C – Informed Consent

ORI | Office of Research Integrity

INSTITUTIONAL REVIEW BOARD

STANDARD (ONLINE) INFORMED CONSENT

STANDARD (ONLINE) INFORMED CONSENT PROCEDURES

The Project Information and Research Description sections of this form should be completed by the Principal Investigator before submitting this form for IRB approval. Use what is given in the research description and consent sections below when constructing research instrument online.

Last Edited May 13th, 2019

Today's date: 04/23/2020		
PROJECT INFORMATION		
Project Title: Uniform Clinical Evaluation for Video Laryngoscopy in Nurse Anesthesia Training: A Policy Proposal		
Principal Investigator: Kristen Yelverton	Phone: 601-325-4525	Email: kristen.yelverton@usm.edu
College: Nursing and Health Professions	School and Program: School of Leadership and Advanced Nursing Practice	

RESEARCH DESCRIPTION

1. **Purpose**:

   The purpose of the survey is to develop an Objective Structured Clinical Examination on Video Laryngoscopy.

2. **Description of Study:**

   An anonymous electronic survey will be utilized to ascertain evaluation of the OSCE template from a professional perspective. The survey can be completed in 5-10 minutes with minimal inconvenience to particpants. The data will be collected and analyzed for common themes. This data will be used to adjust the OSCE template if deemed necessary. Results will be disseminated at USM DNP Scholarship Day in September 2020.

3. **Benefits:**

   No benefits have been idenitified to the participant or to others as a result of participation in the study,

4. **Risks:**

   The time irequired to complete this survey is the only expected inconvenience. The survey is brief and consists of five questons to minimize the inconvience to the particiapnt.

5. **Confidentiality:**

   The electronic survey is anonymous with no particiant identifiers. Deidentified survey results will be kept confidential by storing on a password protected computer, and in a locked drawer. Following the dissemination of research results, electronic data will be destroyed by deleting from the password protected computer and trash bin will be deleted. Physical data will be destroyed by shredding.

6. **Alternative Procedures:**

The survey is voluntary with no repercussions for non-participation. Alternatives to participation will be the choice to not participate.

7. **Participant's Assurance:**

This project and this consent form have been reviewed by the Institutional Review Board, which ensures that research projects involving human subjects follow federal regulations. Any questions or concerns about rights as a research participant should be directed to the Chair of the Institutional Review Board, The University of Southern Mississippi, 118 College Drive #5125, Hattiesburg, MS 39406-0001, 601-266-5997.

Any questions about this research project should be directed to the Principal Investigator using the contact information provided above.

CONSENT TO PARTICIPATE IN RESEARCH

I understand that participation in this project is completely voluntary, and I may withdraw at any time without penalty, prejudice, or loss of benefits. Unless described above, all personal information will be kept strictly confidential, including my name and other identifying information. All procedures to be followed and their purposes were explained to me. Information was given about all benefits, risks, inconveniences, or discomforts that might be expected. Any new information that develops during the project will be provided to me if that information may affect my willingness to continue participation in the project.

Include the following information only if applicable. Otherwise delete this entire paragraph before submitting for IRB approval: The University of Southern Mississippi has no mechanism to provide compensation for participants who may incur injuries as a result of participation in research projects. However, efforts will be made to make available the facilities and professional skills at the University. Participants may incur charges as a result of treatment related to research injuries. Information regarding treatment or the absence of treatment has been given above.

CONSENT TO PARTICIPATE IN RESEARCH

By clicking the box below, I give my consent to participate in this research project.

☐ Check this box if you consent to this study, and then click "Continue." (Clicking "Continue" will not allow you to advance to the study, unless you have checked the box indicating your consent.)

If you do not wish to consent to this study, please close your browser window at this time.

APPENDIX D -OSCE Template

ANESTHESIA OBJECTIVE STRUCTURED CLINICAL EXAM
GLIDESCOPE-VIDEO LARYNGOSCOPY

LEARNER OUTCOMES:

1. Proper Equipment Handling and Functionality
2. Be able to evaluate/explain the need for video laryngoscopy
3. Provide patient safety during laryngoscopy
4. Increase in first-attempt intubation success rates
5. Develop skills for use in difficult airway situations/algorithms

DOMAINS: (Select up to 3)

Assessment – Pre/intra/post op	Evaluation of teaching
Consent	Formative evaluation - feedback
Communication	Interprofessional collaboration
Clinical skill	Performance assessment
Critical thinking	Progression evaluation
Didactic knowledge	Summative evaluation

PURPOSE: Student practice and Formative Evaluation

LEARNER OBJECTIVES:

1. Identify patients at need for video laryngoscopy.
2. Demonstrate skills and knowledge needed to properly set up the Glidescope.
3. Appropriately and safely execute laryngoscopy via video Glidescope

INDIVIDUAL OR GROUP OSCE: Individual

REQUIRED READING and ASSOCIATED LECTURES:

1. Nagelhout: Chapter 24-Airway Management
2. Barash: Chapter 28-Airway Management

REQUIRED VIDEO:
https://www.verathon.com/glidescope-avl/
-Video also posted below images

REQUIRED PARTICIPANTS: Volunteer student, Examiner (for summative evaluation)

VENUE: Lab

STUDENT LEVEL OF OSCE: Semester 1-2, 3-4, 5-6, 7-9 (Circle one)

TIME ALLOTED: 30 minutes

SEQUENTIAL PRACTICE & TESTING: Awake Video Laryngoscopy

RECOMMENDED PRACTICE PRIOR TO EXAMINATION: 6 times (30 minutes each), 180 minutes total

CONTENT OUTLINE

CONTEXT:

You are assigned to Mrs. Smith who is having an Anterior Cervical Discectomy and Fusion performed. This will be a two-level procedure on C3-4. Mrs. Smith is a 56-year-old female who has a history of a herniated cervical disc and reports radiculopathy. She has severe neck stiffness with poor range of motion and pain with extensive movement.

Preoperative information is listed below:

Past Medical History	Hypertension, Rheumatoid Arthritis
Past Surgical History	Hysterectomy, Carpal Tunnel Release, Colonoscopy, Tonsillectomy
Allergies	NKDA
Current Medications	Metoprolol, Methotrexate, Ibuprofen, Celecoxib, Multivitamin, Iron Supplement
Diagnostic Tests	EKG: Normal Sinus Rhythm CXR: Lungs clear, no acute chest disease CT C-spine: degenerative changes, mild disc herniation C3
Labs	Na: 137 WBC: 7.2 RF: 30 Cl: 104 HCT: 32 Anti-CCP: 28 K: 3.9 HGB: 9. ESR:40 Ca: 8.8 PLT: 215 CRP: 1.7 Glu:98
Vital Signs	BP: 142/92 RR: 14 Temp: 98°F Wt:150 lbs (68.18kg) HR: 65 SpO2: 99%. Ht: 5'5" BMI: 25
Airway	MM: III TMD: >3 FB Dentition: Intact, caps noted Neck ROM: Limited
NPO	Since 2200 last night

Formulate an anesthetic plan according to patient and related information.

EQUIPMENT& SUPPLIES:

Patient with intravenous access
OR Table
Anesthesia Machine/Breathing Circuit
Standard Monitors
Ambu Bag

Suction
Surgical Pillow for Neutral head position
Glidescope
Power supply
GVL Stats
GlideRite Stylet
Appropriately Sized Endotracheal Tube
10 ml syringe (for ETT)
Induction Drugs
Eye Protection
Stethoscope
Tape
Tongue blade
Various sized oral/nasal airways
Oxygen mask

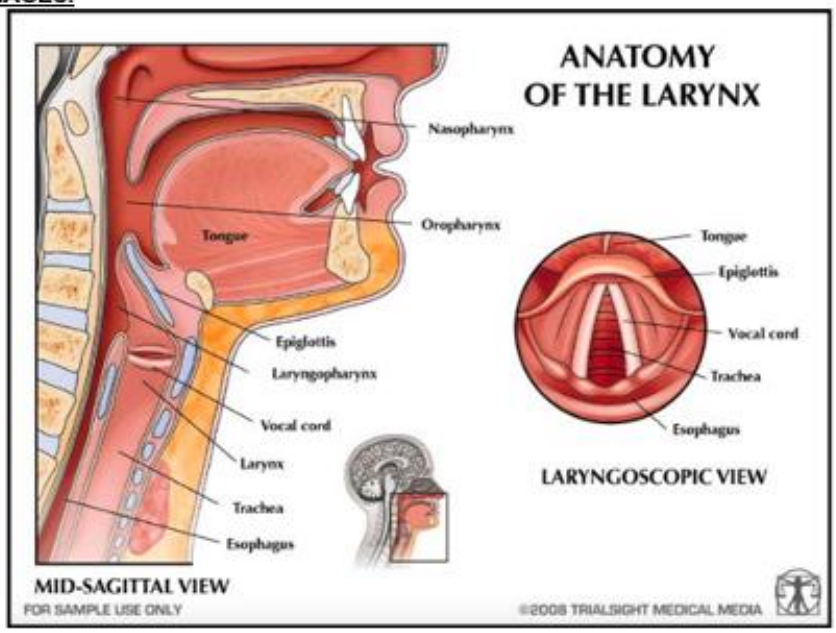
SITE SELECTION:
Oropharynx, Laryngopharynx

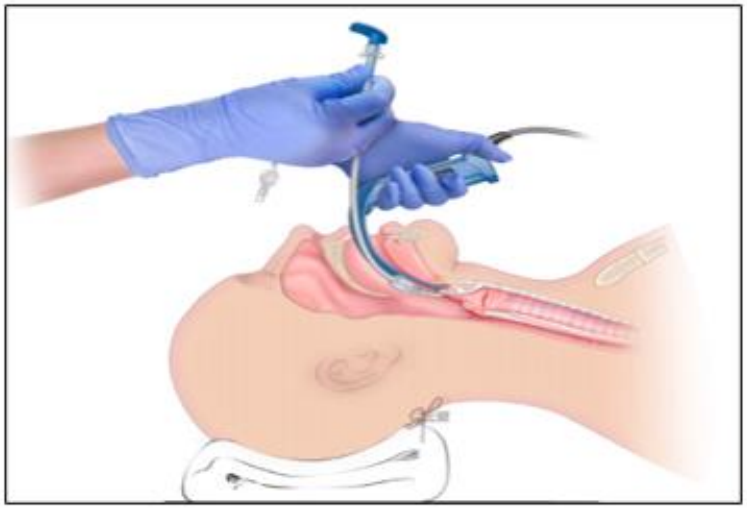
TASK STATEMENT:
Your task is to appropriately gather all supplies, demonstrate proper setup of the video laryngoscope, and walk the preceptor through inducing and intubating a patient with a video laryngoscope while identifying key landmarks through the process.

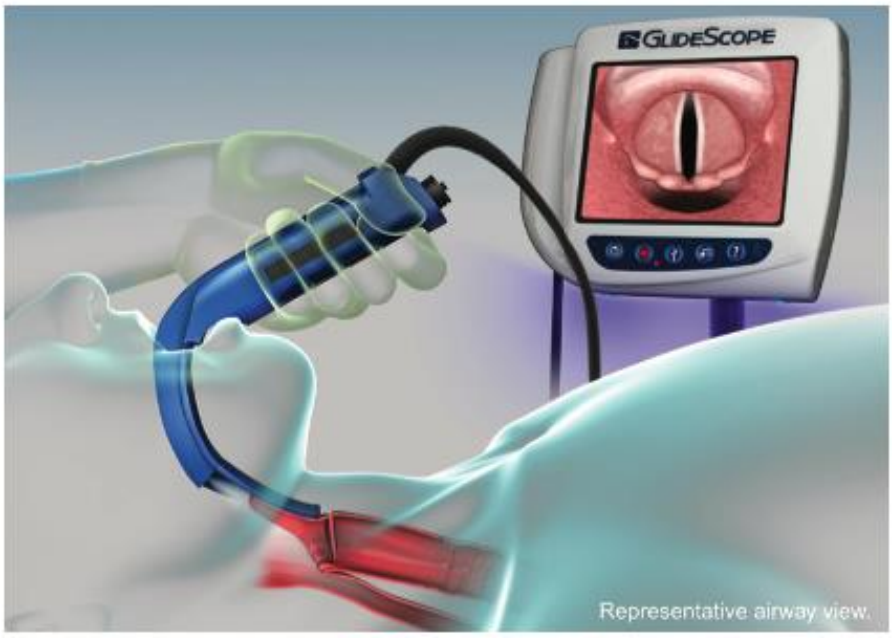
PROCESS:
1. Assess patient preoperatively; airway anatomy, neck range of motion, c-spine, etc.
2. Prepare operating room and prepare your set-up.
3. Ensure anesthesia machine is properly checked, standard monitors, suction, and appropriate equipment is available.
4. Have Glidescope in the operating room, confirm that it will turn on, video screen properly functioning, battery life is sufficient and backup power supply.
5. Chose appropriate size GVL single-use stat for the patient and add to your set-up.
6. Chose appropriate size endotracheal tube based on previous patient assessment and place a GlideRite stylet inside the tube. Have a 10 mL syringe available to inflate the ETT cuff once safely in place.
7. Have eye protection out and pieces of tape ready for securing ETT.
8. Draw up induction medications.
9. Ensure your set-up is complete before bringing patient back to the OR.

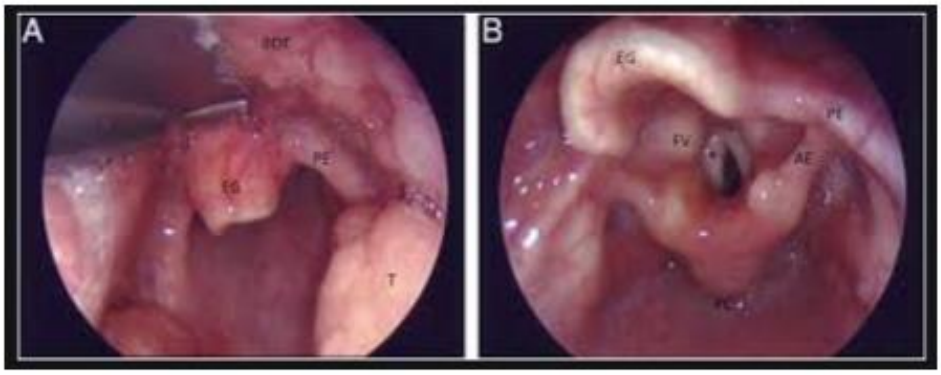
10. Once the patient enters the OR, position patient on the bed, have a pillow to support the head/neck in neutral position, apply monitors, turn on suction.
11. Turn on Glidescope, position monitor within reach/view and try to keep monitor as close to your direct facing view.
12. Insert video wand into chosen GVL stat and keep in package to keep clean until use.
13. Pre-oxygenate patient and make sure set up is within reach.
14. Induce patient, when apneic and relaxed proceed with intubation.
15. Place eye protection.
16. Scissor mouth open with right hand and carefully insert Glidescope into the mouth with the left hand until camera tip no longer seen.
17. Turn to the video screen and identify anatomy. Advance stat/camera until view of the glottis is obtained. Advancing or retracting camera could help get a better view. According to the manufacturer, they recommended that viewing the glottis on the top 1/3 of the screen is best.
18. Now look back at the patients mouth and insert the ETT with the GlideRite stylet partial into the mouth.
19. Turn to the video screen again and visualize ETT and glottis. Advance ETT through the vocal cords by pressing the tube off of the stylet about 5 cm at a time. Try not to advance the stylet through the vocal cords. Visualize ETT passing through the vocal cords and stop advancing once cuff has fully passed through the cords.
20. Once the ETT has been placed through the vocal cords and stylet has been removed, use the 10 ml syringe to inflate the cuff to a minimal occlusive pressure.
21. Carefully remove GVL stat/camera, while still securing the ETT with your hand.
22. Hook up anesthesia breathing circuit, give breaths manually while listening with stethoscope to ensure proper placement, while also looking for End Tidal CO2 on the monitor.
23. Tape ETT and record length of tube and where it is secured at.
24. Turn off video display, remove disposable GVL stat.
25. Return the Glidescope and GlideRite stylet via protocol for proper cleaning.

IMAGES:


ANATOMY
OF THE LARYNX
Nasopharynx
Oropharynx
Tongue
Epiglottis
Laryngopharynx
Vocal cord
Larynx
Trachea
Esophagus
MID-SAGITTAL VIEW
FOR SAMPLE USE ONLY
Tongue
Epiglottis
Vocal cord
Trachea
Esophagus
LARYNGOSCOPIC VIEW
©2008 TRIALSIGHT MEDICAL MEDIA




GLIDESCOPE
Representative airway view.


A
B

GlideScope® Products and Systems

SINGLE-USE SYSTEM				
VIDEO BATON 1-2	GVL 0	GVL 1	GVL 2	GVL 2.5
For GVL 0 - 2.5 Stats	< 1.5 kg	1.5 - 3.8 kg	1.8 - 10 kg	10 kg - 28 kg
				
VIDEO BATON 3-4	GVL 3		GVL 4	
For GVL 3 - 4 Stats	10 kg - Adult		40 kg - Morbidly Obese	
				
GLIDESCOPE PREMIUM CART			AVL PORTABLE STAND	
				

Required Video:
Double Click in box below to start video

Note. To access the video mentioned above double click in the red box

DEBRIEFING FORM:
Three to five questions (look at literature to see what type of questions are asked in debriefing) guiding the student to evaluate their performance, OSCE steps/process, etc.

1. **Can you describe the anatomy of the oropharynx and laryngopharynx in order that will be seen while placing a Glidescope?**
2. **What type of injuries can occur, if any?**
3. **Why does the ETT have to be pushed off the GlideRite stylet once at the level of the vocal cords?**
4. **What happens if the screen goes blank or live screening is no longer captured during the laryngoscopy?**

ASSESSMENT

RUBRIC FOR GLIDESCOPE VIDEO LARYNGOSCOPY

QUESTION & DEMONSTRATION STATION:

	TASKS	PASS	FAIL	COMMENTS
	1. Prepares and selects appropriate equipment			
	2. Selects appropriate size endotracheal tube and Glidescope GVL			
*	3. Demonstrates proper use of video laryngoscopy and how to prepare for use			
*	4. Identifies anatomy and structures appropriately on image provided			
*	5. Identifies true vocal cords and trachea for ETT placement			
*	6. Demonstrates proper placement of ETT using GlideRite stylet			
*	7. Demonstrates proper mechanics for removing equipment from patient and checking ETT placement			
*	8. Demonstrates proper securing of ETT after placed			
*	9. Demonstrate equipment breakdown, appropriately clean machinery and storage			
	10. Re-evaluates patient status			

Steps with * Must be properly completed. All steps must be completed/passed to receive a passing grade.

The OSCE by the student demonstrates foundational knowledge and correct use of the ultrasound machine in obtaining IV access: (Circle one) **PASS FAIL**

Does the student need to repeat this OSCE at a later date to satisfy learning requirements? (Circle one) **YES NO Date to return for evaluation:** _____

EXAMINER: _____ DATE: _____

APPENDIX E – Report of Findings

Laryngoscopy Technique

Tracheal intubation is a process of using instruments to obtain a view of the patient's vocal cords, passing an endotracheal tube (ETT) through the glottic opening into the trachea, and securing the tube inside the trachea. "Flexion of the neck and extension of the atlanto-occipital joint, or sniffing position, allows for proper alignment of the oral, pharyngeal, and tracheal axis" (Nagelhout & Elisha, 2018, p. 410). DL primarily uses this technique to achieve a direct view from the providers' eye to the patient's glottic opening or vocal cords. Both DL and VL techniques use the same anatomical landmarks as a reference guide. DL uses a handle that has two types of blades that directly attach it. The Macintosh (MAC) blade has a curved angle and proper placement of the tip of the blade is placed in the vallecula, where the Miller blade is a straight blade and proper placement of the tip of the blade is posterior or under the epiglottis. VL uses an indirect view of the larynx, in real-time. Different brands and types of VL devices are available. The anatomical structures are viewed on an external viewing screen, no matter what brand device is used (Nagelhout & Elisha, 2018).

Patients may have coexisting factors that require a provider to alter or create a new anesthetic plan in order to keep the patient safe. Patients with cervical spine disease, rheumatoid arthritis, ankylosing spondylitis, and neck tumors may severely decrease neck range of motion. Aligning the three axes by neck flexion and extension of the atlanto-occipital or placing the patient in the *sniffing* position, creates the best glottic view for DL. With this decrease in range of motion, the patient cannot be placed in a true sniffing position and the glottic view will be decreased. Trying to force a patient into a sniffing

position or overextension of the neck to improve the glottic view could cause cervical spine trauma (Nagelhout & Elisha, 2018). The *GlideScope*® video laryngoscope is a better choice than DL for situations like these with c-spine concerns, as the head and neck can be kept in a more natural or neutral position for intubation (Nagelhout & Elisha, 2018).

GlideScope® Video Laryngoscopy

The *GlideScope*® was the first widely available video laryngoscope. One version has a single-use system called *GlideScope® AVL*. This system has a video monitor on a portable stand which allows you to position the monitor to where the provider can best visualize it. Unlike DL, the provider will majorly use the screen to visualize anatomic structures and pass the ETT. The *GlideScope*® has single-use Stats that are disposable. There are six sizes that range from preterm infants to large adults which allows the provider to tailor this system to each patient. These Stats are curved similar to the MAC blade and are one fluid piece that slides over the video baton. A cable from the screen attaches the top of the handle or video baton. A flexible tip camera is at the other end of the baton. The entire baton/camera tip is inserted into the plastic stat and interlocks to hold the disposable Stat in place. The *GlideScope*® system also requires the provider to use the *GlideRite* Stylet in the ETT to aid with intubation. This stylet also inserts into the ETT but is a hard/rigid, metal stylet that is in a preformed shape. These stylets must be used to aid in inserting the ETT into the mouth and directing it toward the vocal cords because of the angle of the *GlideScope*® and the limited space available in the patient's mouth (Verathon®, 2020).

A series of steps recommended by the manufacturer must be followed for proper functioning and usage of the *GlideScope*® video laryngoscope and will be explained. The provider observes the patient insert the handle/camera/stat into the mouth until the camera tip is no longer seen. The provider now observes the video screen to identify anatomy. Advance the stat/camera until the view of the glottis is obtained. Since the Stat is shaped like the MAC blade, the tip sits in the vallecula. Advancing or retracting the camera could help get a better view, but the provider may have use lifting technique as with DL. Positioning the view of the glottis on the top third of the screen is best. The provider must look back at the patient's mouth and insert the ETT with the *GlideRite* stylet partial into the mouth. The video screen is used again to visualize the ETT and glottis. By using the handle on the stylet, direct and advance the ETT through the vocal cords by pressing the tube off of the stylet a few centimeters at a time. The goal is to not advance the stylet through the vocal cords and visualize the ETT passing through the vocal cords. Once the balloon cuff is through the cords, hold the tube and finish removing the stylet. Leave the video laryngoscope in place so that you can verify that the ETT did not move while removing stylet and then secure the ETT. (Verathon®, 2020).

Objective Structured Clinical Examination

An OSCE, or Objective Structured Clinical Examination, is a clinical or performance-based examination that tests the SRNAs knowledge, clinical skills, and how they incorporate their knowledge into practice. Traditionally, OSCEs are presented as a series of stations, where the competence of a skill area is assessed at each one. While at these stations, the student will be exposed to a set of examiners for each station, and the standards expected of the skill are specified ahead of time by a blueprint or a template.

According to Harden et al. (2016), there are eight components or features illustrating an OSCE. Harden et al. categorized those components as "*eight P's"* (p. 9), of which each are listed hereafter; "performance assessment; process and product; profile of learner; public assessment; participation of staff; pressure for change with poor overall class performance" (Harden et al., 2016, p. 9); and "pre-set standards of competence" (Harden et al., 2016, p. 10). The OSCE has shown a positive impact on education and its effects are acknowledged by many. The OSCE stimulates the learner to develop the necessary clinical skills to achieve competency. Harden et al. (2016) also mentions, that using an OSCE as a diagnostic tool has the potential to identify flaws related to the program and the students, in which both can be improved on.

According to Ballister (2018), the Council on Accreditation (COA) of Nurse Anesthesia Educational Programs, requires the incorporation of simulation training within the program's curriculum, in order to comply with standards, set forth for the training of doctoral prepared nurse anesthesia students. Numerous training aides and educational preparations could theoretically be used for simulations with hopes to enhance the SRNAs knowledge and skill set. Simulations also allow SRNAs to think, act, and carry out these skills in a harmless environment before involving care of a real-life patient. "The OSCE is one method educators can incorporate to demonstrate compliance with the COA standard because it can be used for both skill reinforcement and evaluation of SRNAs in multiple areas throughout the curriculum" (Ballister, 2018, p. 60).

OSCE creation was credited to Dr. Harden and associates back in the 1970's (Onwudiegwu, 2018). Today, OSCEs are becoming more popular in other medical subsidiaries, rather than just medical schools. Wunder et al. (2014), mentions that OSCEs

are being utilized in other countries such as a university in the UK for a nurse practitioner program and also in the Israel for national certification boards. According to an interview with Dr. Mary Jane Collins, DHA, CRNA, (personal communication, April 2, 2020), the Nurse Practitioner Program at USM routinely utilizes the OSCE format in their curriculum.

Standardized Method of Assessment

A standardized method of assessment for VL has the potential to be beneficial to both the NAP and the SRNA. The OSCE could be implemented by the NAP as a method to enhance clinical performances of the SRNA. The OSCE could also enhance the simulation aspects of a curriculum in providing dependable and consistent teaching to current and future SRNAs of the NAP. Simulations have been utilized in courses to help transition what is taught didactically to hands-on skills (Wunder et al., 2014).

The OSCE provides a standardized, step by step process of teaching VL to the SRNAs. By implementing the OSCE as a standardized method of assessment, it would help the SRNA to not miss critical steps during VL or improperly handle the equipment that could potentially produce negative consequences. OSCEs also allow the SRNA to have individualized instruction that helps develop these proper techniques for safe usage. "The ability to first practice what is taught and then be tested in a standardized fashion is a unique attribute of the OSCE" (Wunder et al., 2014, p. 420). While simulation practice is much different than caring for real-life patients, the OSCE can prepare the SRNA for clinical experiences and allow them to work through difficulties without serious consequences. Implementing an OSCE for VL could provide a reliable and easy way to replicate teaching and evaluation methods due to its standardized method of assessment.

As Ballister (2018) mentions when developing an OSCE, integrating uniformity and processes within the design are important elements as it ensures that all students receive equal guidance throughout their training.

Formative and Summative Evaluations

According to Wunder et al. (2014), an OSCE is a "gold standard for practitioner competency assessment" (p. 420). An OSCE can be used as both summative and formative evaluations for the SRNA. Summative evaluations usually take place in the classroom following a lecture or instruction in the form of tests or examinations. The summative type may evaluate the SRNA at intervals during the semester and is based on the knowledge acquired. The OSCE will provide a template that can be used as a checklist for the summative evaluation of the SRNA (Wunder et al., 2014).

A formative evaluation assesses the ability of the learner to take their acquired knowledge and put it into practical use or clinical skills for the SRNA. The formative type of evaluation provides feedback on the OSCE performance which can help identify objective accomplishment or recognize areas that need improving upon. Implementing an OSCE would evaluate the SRNAs knowledge of VL and how they interpret the information into clinical practice, and the competency of both.

First Pass Success and New Users

As mentioned above, laryngoscopy is a skill many different providers will use and has the potential to be intimidating for anyone performing these skills for the first time. Airway anatomy differs in every person. According to a pilot study, anatomical airway structures may not be as easily identified by a beginner SRNA, therefore, may have low success rates for endotracheal intubation. "*GlideScope*® video laryngoscopy improves the

view of the glottic opening compared with direct laryngoscopy and may improve the success rate for laryngeal intubation" (Wands & Minzola, 2015, p. 403). The optimal choice for new providers or beginner SRNAs who have never performed laryngoscopy on a real patient should consider using VL initially. As described, the *GlideScope*® VL provides a real-time, indirect view on an external viewing screen. This real-time view will allow a preceptor to see exactly what the student sees and guide the student through the entire process. With DL, the preceptor can only see what is going on outside the patient's mouth and cannot see any anatomical structures that the student sees or view the ETT passage through the vocal cords (Lewis et. al., 2017).

An observational study found compared the first pass success rate of DL with the *GlideScope*® VL. The results of the first pass intubation attempt showed an 80% success rate with DL, 93% success rate with a *GlideScope*® VL, and a 99% success rate using a *GlideScope*® after the initial attempt failure of DL (Ibinson et al., 2014). First pass success can be influenced by patient factors such as Mallampati score, mouth opening, cervical spine mobility, thyromental distance, incisor distance, dentition, and body mass index to name a few. These factors are also considered difficult airway characteristics (Ibinson et al., 2014).

Potential Negative Consequences

As professionals in the medical field, it is always difficult to hear about or experience events that impact patients negatively. The American Association of Nurse Anesthetists (AANA) Foundation has a *Closed Claims* research team that investigates and researches adverse events that potentially classify CRNAs as the source or contributing factor to the adverse event. One claim involved a 36-year-old female having

a procedure done under local anesthesia at a individual clinic. After intravenous medications were administered and the patient was positioned, she began having difficulties. A disposable capnography device was used to confirm the appropriate placement of the ETT after the first attempt. The color on the capnography device indicated correct placement, yet the patient continued to decline. The CRNA was unable to ventilate for the patient and unsuccessful at intubation after multiple failed efforts. Emergency medical services arrived, placed an emergency airway, and transferred the patient to the emergency room. Unfortunately, the patient's condition worsened and quickly passed after arrival to the emergency room. In the discussion about the claim, one statement mentioned that "the facility did not have the equipment needed to manage a difficult airway" (Hranchook et al., 2018, p. 314). If the facility would have had a video laryngoscope, the patient would have had increased chances of being intubated after the first attempt with visual confirmation of correct placement. If the CRNA was not trained or knew how to use the video laryngoscope equipment, then multiples attempts could have been attempted again or patient injury from misuse. Another claim in the article described an event that involved a failed intubation resulting in absent breath sounds. After returning to the OR, the placement of the ETT was assessed by a fiberoptic scope and was confirmed to be in the esophagus. Here again, where time is critical, having a video laryngoscope could have improved the success of the initial intubation. With the implementation of this OSCE, proper training and knowledge would already be instilled before real-life situations, as these mentioned, that could help prevent these adverse events (Hranchook et al., 2018).

Another concern for both DL and VL is a patient injury during tracheal intubation. Injuries can include but are not limited to bruising or rupturing of lips; chipping or knocking out a tooth; and mucosal injuries of tonsils, oropharynx, and tongue. A randomized, blind clinical study was performed, at a large teaching institution, comparing injury results of DL versus *GlideScope*® VL. A total of 155 intubations were observed and divided into groups resulting in 78 participants in the *GlideScope*® group and 77 in the DL group. Out of the total 155 observations, 27 injuries, both minimal and moderate, were documented. The *GlideScope*® group contributed to 16 of those injuries and the DL group contributed to 11 injuries (Scholtis et al., 2017). Barash et al. (2017), mentioned that blind manipulation of the ETT as it enters the airway but not yet visualized by the video screen is directly related to inpatient injury while using the *GlideScope*®. Paying attention to the patient's mouth as you introduce the ETT, making sure the *GlideRite* stylet is no longer than the ETT of choice, and maintaining the ETT midline will help to decrease the incidence of injury (Barash et al., 2017).

Another potential negative consequence is related to SRNA. Learning new information and the acquired skills that follow can be intimidating, especially when errors can be detrimental to others. The preceptor can only see what is going on outside the patient's mouth and cannot see any anatomical structures that the student sees. Judgment and actions are solely based on the student’s intuition and knowledge. This poor judgment could result in missed intubations, injuries, and ultimately reducing student confidence in intubation skills. Using VL allows a preceptor to see exactly what the student sees and guide the student through the entire process. Data from a seminal article showed that students in the VL study group had more successful attempts and

were more confident of the success of their tube placement than the control group with DL (Low et al., 2008).

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