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Objective Structured Clinical Evaluation for Supraclavicular and Femoral Nerve Blocks Utilizing Ultrasound Guidance for Student Nurse Anesthetists

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OBJECTIVE STRUCTURED CLINICAL EVALUATION FOR SUPRACLAVICULAR AND FEMORAL NERVE BLOCKS UTILIZING ULTRASOUND GUIDANCE FOR STUDENT NURSE ANESTHETISTS

by

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ABSTRACT

The purpose of this DNP project was to create a tool to teach and evaluate student registered nurse anesthetists (SRNAs) at The University of Southern Mississippi (USM) on supraclavicular and femoral nerve blocks to promote safety in the clinical setting. An objective structured clinical evaluation (OSCE) for ultrasound-guided supraclavicular and femoral nerve blocks was created as the basis for this project. Best-practice techniques as identified by the AANA's 14th standard of nurse anesthesia practice were researched and used in the development of the OSCE to promote a culture of safety for SRNAs and patients (AANA, 2019).

A culture of safety was promoted by creating an OSCE that can be used to test and evaluate SRNAs before they enter into a clinical setting. This will allow SRNAs to become more comfortable with performing these nerve blocks by practicing the process of the blocks as well as the techniques used to perform the blocks. Becoming more comfortable with these types of blocks will translate into increased safety for patients receiving these blocks from future USM SRNAs.

Step-by-step guides for the nerve blocks were developed. A survey was sent out to current second-year SRNAs and nurse anesthesia faculty at USM. The OSCE was edited based on their feedback after participating in the OSCE and completing the survey. Feedback from the survey was positive and minimal changes were made to the OSCE. All participants agreed that the OSCE was beneficial in presenting clear and exact instructions on the execution of supraclavicular and femoral nerve blocks and that it included all of the necessary information to help SRNAs be successful in the clinical arena.

ACKNOWLEDGMENTS

We would like to thank our committee chair, Dr. Michong Rayborn, for her unwavering support, encouragement, and patience throughout the completion of this project. We would also like to thank our committee member, Dr. Nina McLain, for her support and direction.

DEDICATION

I would like to thank God first and foremost, in whom all things are possible. I would like to dedicate this achievement to my wife, Brittney, and children, Callen and Cambrie, for their encouragement, love, sacrifice, and support throughout this entire educational endeavor. I love you to the moon and back! I would like to thank our families for their endless support and love as well. - Christopher Bond

First of all, I would like to thank God for the many doors He has opened for me throughout my life to get me to where I am today. I would like to dedicate the completion of this project to my wife, Torie, and my three daughters, Paisyn, Tatum, and Ellie. Without their constant love, support, encouragement, and sacrifice, this would not have been possible. Thank you for motivating me daily, I love you! – Mitchell Fowler

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LIST OF ABBREVIATIONS

AANA	American Association of Nurse Anesthetists
ASA	American Society of Anesthesiologists
ASRA	American Society of Regional Anesthesia and Pain Medicine
ASM	Anterior Scalene Muscle
BP	Brachial Plexus
COA	The Council on Accreditation of Nurse Anesthesia Programs
CRNA	Certified Registered Nurse Anesthetist
EBP	Evidence-Based Practice
FA	Femoral Artery
FN	Femoral Nerve
IPM	Iliopsoas Muscle
LA	Local Anesthetic
LAST	Local Anesthetic Systemic Toxicity
MSM	Middle Scalene Muscle
NAP	Nurse Anesthesia Program
OR	Operating Room
OSCE	Objective Structured Clinical Evaluation
RA	Regional Anesthesia

RN	Registered Nurse
SA	Subclavian Artery
SCM	Sternocleidomastoid Muscle
SQ	Subcutaneous
SRNA	Student Registered Nurse Anesthetists
USM	The University of Southern Mississippi

CHAPTER I - INTRODUCTION AND BACKGROUND

A student registered nurse anesthetist (SRNA) is a registered nurse (RN) who is enrolled in a nurse anesthesia program for education and training to become a certified registered nurse anesthetist (CRNA). Nurse anesthesia programs (NAP) are notorious for their grueling coursework, intense clinical training, and high expectations to ensure patient safety. SRNAs apply the knowledge gained through their coursework and clinical simulation to real-life situations at various clinical sites throughout their program. They are evaluated by CRNA preceptors who are willing to train them on location at the clinical sites.

Problem Description

Maintaining a culture of safety is the 14th standard of the American Association of Nurse Anesthetists (AANA) Standards for Nurse Anesthesia Practice. The AANA describes this standard as having a "...collaborative and cooperative patient care environment through interdisciplinary engagement, open communication, a culture of safety, and supportive leadership" (AANA, 2019, p. 4). With all of the stresses that come with being an SRNA, each student's primary focus must be their patients' safety. Fostering a culture of safety should include students being prepared when performing a new procedure.

A new SRNA may be prepared for standard procedures while senior SRNAs are prepared for more complicated ones. These differing types of SRNAs should be evaluated accordingly. CRNAs evaluating students frequently have different levels of expectation based on their levels of clinical experience, allowing their biased views to

skew their evaluation of a student (Bonanno, 2019). Utilizing an objective tool to evaluate SRNAs at their current level of clinical experience would be appropriate.

SRNAs are continuously evaluated during their clinical day to ensure safety in the care they provide. If an issue that is new for that student arises during a clinical day, the student needs other experiences to fall back on. Clinical simulation is one type of experience the student can recall. Simulation is commonly used as a tool used to teach skills and techniques for different procedures, but the student should also be tested in a simulated setting to prove competence for specific procedures. Skills learned in a simulated setting can help students feel prepared in the clinical setting, promoting safety.

SRNAs learn many vital skills in the NAP, including the ability to perform nerve blocks. Frequently nerve blocks are introduced to SRNAs in a clinical setting where they either watch or assist CRNAs or anesthesiologists perform the block. The sudden introduction of nerve blocks can be stressful for the student if they have never performed a nerve block on a patient or in a simulation scenario.

According to the American Society of Regional Anesthesia and Pain Medicine (ASRA, 2020), two of the most frequently used peripheral nerve blocks are the femoral nerve block and the brachial plexus block. Students should be familiar with these types of blocks and how one is performed while in the clinical setting. Creating an Objective Structured Clinical Exam (OSCE) for a supraclavicular approach for a brachial plexus block and the femoral nerve block was the primary focus of this project.

Purpose and Context

The purpose of this project is to create a tool to be used in the testing and evaluation of SRNAs' clinical abilities to perform ultrasound-guided supraclavicular and femoral nerve blocks while creating an environment of learning and safety. Using an ultrasound-guided approach for nerve blocks allows for visualization of the patient's anatomy, guidance for the needle around structures that might be damaged by the needle, and confirmation that the needle is in its intended location for an optimal block (Orebaugh & Kirkham, 2020). The NAP at The University of Southern Mississippi currently uses simulation and clinical experiences as teaching tools for these nerve blocks, but no simulation testing and evaluation tool is used. An objective structured clinical examination (OSCE) can be implemented for ultrasound-guided supraclavicular and femoral nerve blocks.

An OSCE is commonly used in adjunct with coursework, clinical sites, simulation, and observation to measure students' competence. Students are evaluated on many elements, including gathering data, communication, physical examination, professionalism, history taking, and clinical strengths and weaknesses (ASRA, 2020). An OSCE is an excellent means to incorporate simulated clinical experience required by the Council on Accreditation of Nurse Anesthesia Education Programs (COA) into USM's curriculum.

The COA (2019) maintains a list of standards for accreditation of nurse anesthesia educational programs. Curriculum standard E.11 requires that simulated clinical

experiences be incorporated into the curriculum. The COA defines a simulated clinical experience as a learning experience where the representation of clinical activities is "...designed for competency attainment, competency assessment, or competency maintenance…" and includes options like "...standardized patients, web-based simulation, computer-based simulation, manikin-based technologies...to bridge didactic learning with safe and effective patient care delivery" (COA, 2019, p. 39-40). While incorporating competency-based assessment and practice for SRNAs in a controlled environment, an OSCE exercises both a culture of safety and an approved simulated clinical experience.

Available Knowledge

SRNAs and Stress

SRNAs are dealing with a loss of income, information overload, lack of time for themselves and their families, relocation, and meeting the expectations they set for themselves (Stone, 2012, May). In a first-of-its-kind study of SRNAs, Wildgust (1986) found that a significant stressor for senior SRNAs is performing *satisfactorily*. Wildgust continued that, rather than removing all stressors, the goal is to create a learning environment where students react positively while gaining knowledge and competence.

Simulation exercises can introduce SRNAs to new skills in a less stressful environment. When the SRNA sees this new skill performed in the clinical setting, they can follow a better understanding of what is transpiring. Simulation, in this instance, gives the student a foundation of knowledge to build on. When SRNAs are in a situation where they are expected to know how to perform a skill, they can recall the knowledge

gained from the simulated scenario. This knowledge does not alleviate all stress in the situation, but the previous simulated experience will allow the student to react positively to their current clinical experiences.

OSCE Defined

OSCEs were first introduced in 1975 and more readily used by 1979 as an assessment tool for medical school students (Harden and Gleeson). They have continued to evolve into a multipurpose evaluation tool (Zayyan, 2011). An OSCE can be given to SRNAs in a simulation-type setting, allowing for discussions about what was done right and wrong and what students should work on to perfect the skill. This type of testing gives students training on a particular procedure outside of the operating room where mistakes can be made without harm to a patient, and instant feedback can be provided. This type of learning environment promotes the AANA's 14th standard of nurse anesthesia practice, where a culture of safety is cultivated (AANA, 2019).

An OSCE can be used as a teaching tool and a testing tool. The development of an OSCE requires goals, standardized objectives, a method of evaluation, a needs assessment, and feedback (Ballister, 2018). With standardized objectives and methods of evaluation, OSCEs promote unbiased feedback for the SRNA. In the safety of simulation through an OSCE, SRNAs can think critically using the knowledge they have gained in the classroom, develop skills they are lacking, and learn proper techniques for various procedures. OSCEs can be adapted to any program for any need.

Two types of OSCEs can be implemented, a formative OSCE and a summative OSCE. In a summative OSCE, the result is a pass-fail grade. Failing can add additional stress to the SRNA, and each program using summative OSCEs would need policies in

place on retesting and remedial training. The evaluator can give unidirectional feedback to the student in this type of OSCE, and the student can use this feedback to prepare for retesting.

In a formative OSCE, the focus is more on teaching and learning throughout the process. Formative OSCEs can pinpoint a student's strengths and weaknesses to improve their performance in the future without fear of failure. During a formative OSCE, or immediately following, a critique of the SRNA's performance should be given to the student. Bidirectional debriefing can occur after a formative OSCE, which allows for a discussion between the evaluator and the student (Ballister, 2018).

According to the Society for Simulation in Healthcare, an OSCE should have between three and five objectives (Wittman-Price & Chabalowski, 2015). These objectives drive the basic structure and design of the OSCE. Although tasks in each exam are simulated, performing the tasks allows the student to move from the *knows* level of competence to the *shows* level on Miller's Prism of Clinical Competence (Figure 1). Only when performance is integrated into practice within an actual clinical environment can the top of the prism (*does*) be reached. An element of the student moving up the prism is understanding the atmosphere in which the OSCE is performed. Attitude, skill, knowledge, and professional authenticity can all be improved upon in a simulated setting with the highest degree of realism (Ballister, 2018).

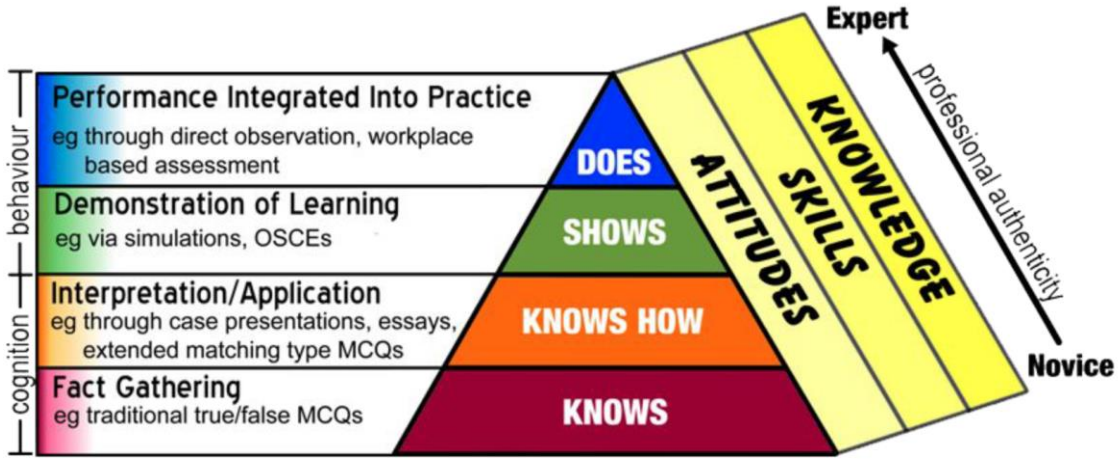


Figure 1. *Miller's Prism of Clinical Competence.*

Incorporating visual, auditory, and kinesthetic teaching methods promotes learning for adult students (Lambert et al., 2014). These methods can be achieved in the form of an OSCE while promoting a learning environment for students. The knowledge gained allows students to be more confident when performing these blocks in the clinical setting because they will have previously practiced the skill.

Ultrasound-Guided Peripheral Nerve Blocks

There has been an increase in the number of surgeries performed on high-risk patients with a more significant number of comorbidities (Spofford et al., 2020). Regional anesthesia and peripheral nerve blocks have helped meet the need for anesthesia to this population. By administering local anesthetics around specific nerves, an anesthesia provider can temporarily block motor and sensory function. Nerve blocks can not only reduce the amount of anesthetic needed for surgery, but they can also increase pain control for the patient (Spofford et al., 2020). They continue to grow in popularity and are being used more frequently.

ASRA (2020) recognizes that two of the most frequently used peripheral nerve blocks are the brachial plexus block and the femoral nerve block. Using an ultrasound-guided approach for nerve blocks allows for better visualization of the intended area rather than using landmarks alone. Better needle guidance and confirmation that the needle is in its intended location for an optimal block are also advantages of an ultrasound-guided approach (Orebaugh & Kirkham, 2020). This project focuses on an ultrasound-guided supraclavicular approach to the brachial plexus block and the femoral nerve block.

The supraclavicular approach to the brachial plexus block poses pneumothorax risk due to the needle's location when entering the body. The risk is more significant when using the landmark technique alone because the subclavian artery is only palpated and gives an approximate location of the pleura. The ultrasound can be used to keep the needle tip visible at all times to reduce the risk of unintentionally penetrating the pleural sac and to spread the local anesthetic to the target nerve. The brachial plexus can then be viewed as a collection of oval structures posterior and superficial to the artery (Bendsten et al., 2020). Placing the ultrasound transducer in the transverse plane proximal to the clavicle and tilting it caudally gives the viewer a cross-sectional view of the subclavian artery. In a femoral nerve block, the transducer is positioned on the femoral crease while the patient is in the supine position. If the nerve is not visible lateral to the artery, the transducer should be tilted proximally or distally until the nerve is identified (Atchabahian et al., 2020). Being able to visualize the area of interest increases the chance of a successful nerve block.

Patient Safety and Satisfaction

Having SRNAs perform an OSCE related to ultrasound-guided supraclavicular nerve blocks and femoral nerve blocks introduces them to the procedure in a simulated environment before performing the blocks in the clinical setting, promoting a culture of safety. The student may feel more comfortable performing these procedures on patients if they have previous experience with the process and technique. Extensive practice could lead to fewer mistakes by the SRNA.

Regional anesthesia can reduce the complications associated with general anesthesia for specific populations. In a study of an international registry of regional anesthesia, it was found that 94.6% of respondents (61.6% of 9969 surgical procedures) who received regional anesthesia for their procedures said they were satisfied and would undergo a peripheral nerve blockade again if needed for future procedures (Ironfield et al., 2014). The results are indicative of the high patient satisfaction of peripheral nerve blockades.

Rationale

Fostering a culture of safety is one of the standards of the AANA (2019) Standards for Nurse Anesthesia Practice. An OSCE on the two most common peripheral nerve blocks would introduce students to the correct technique and provide a foundation of knowledge and competence before performing such blocks in the clinical setting. Evaluating SRNAs' competence through OSCEs promotes this standard, which translates to patient safety.

Specific Aims

The purpose of this project is to provide a teaching tool that will be used for SRNAs as a way to evaluate their competence and clinical ability. The specific aim is to use an OSCE based on performing ultrasound-guided supraclavicular and femoral nerve blocks while creating an environment of learning and safety, which is achieved by guiding proper care through safety and introducing these blocks in a simulated setting, and testing on technique and competence. Upon completion of the OSCE, SRNAs will be more prepared to perform supraclavicular and femoral nerve blocks on patients in a clinical setting. The preparedness of SRNAs translates to them performing satisfactorily, reducing their stress (Wildgust, 1986).

Summary

Regional anesthesia is incorporated into all CRNA programs. Utilizing an OSCE as a teaching tool and evaluating peripheral nerve blocks would benefit USM's NAP. This OSCE would give SRNAs the ability to perform peripheral nerve blocks in a simulated setting and prove their competence before performing nerve blocks on patients, helping reduce their stress level in the clinical setting.

When patients can receive a peripheral nerve block over general anesthesia, they are satisfied with the outcomes, and more than 94% of them would do it again, according to Ironfield et al. (2014). With the increasing popularity of nerve blocks, SRNAs should be tested on their competence of the peripheral blocks they will perform the most. Patients are overall satisfied with peripheral blocks over general anesthesia, and they should remain satisfied.

Objectively evaluating SRNAs' competence based on their knowledge and technique of ultrasound-guided supraclavicular and femoral nerve blocks promotes safety. With these types of blocks being the two most common peripheral nerve blocks, students should understand each before performing them in the clinical setting. The OSCE will allow the student to make mistakes and to learn from those mistakes before attempting one of these blocks on a patient. This project will satisfy the American Association for Colleges of Nursing (AACN) DNP Essentials through the development of this OSCE (Appendix C).

CHAPTER II – METHODOLOGY

Context

The DNP project requirements for the USM College of Nursing and Health Professions include meeting the American Association for Colleges of Nursing (AACN) DNP Essentials. Developing an OSCE satisfies these Essentials (see Appendix C) and incorporates specialty-focused competencies for SRNAs. The OSCE for supraclavicular and femoral nerve blocks utilizing ultrasound guidance allows a learning experience that has not been integrated into the curriculum for the NAP at USM. This OSCE is designed to implement a therapeutic intervention for the patient undergoing a surgical procedure. With the integration and utilization of this OSCE, SRNAs will have the opportunity to learn how to do supraclavicular and femoral nerve blocks successfully before clinical practice. After participation in this OSCE, SRNAs will guide, mentor, and support other student nurse anesthetists to achieve excellence in the evolving area of regional anesthesia.

Steps

Several steps were taken to complete this project to ensure the efficacy and pertinence of the project. After proposing this project to the DNP committee, approval was sought from the Institutional Review Board (IRB). After receiving approval from the IRB (see Appendix E), a thorough search of EBP data was gathered and incorporated to develop an OSCE for SRNAs at USM to be able to successfully administer both supraclavicular and femoral nerve blocks utilizing ultrasound guidance. Along with a literature review based on evidence-based best practice guidelines and the development of an OSCE, an evaluation tool was created for critique and valuable feedback regarding

the effectiveness of the OSCE (See Appendix D). A panel of evaluators was invited to participate in the research. This panel included (a) fellow SRNAs, (b) three NAP instructors, and (c) a NAP director. These evaluators were selected based on their USM NAP status and their ability to provide feedback on what SRNAs may need to know to administer supraclavicular and femoral nerve blocks safely.

Intervention

The intervention for this project was developing an OSCE for supraclavicular and femoral nerve blocks utilizing ultrasound guidance for the enrichment of the USM NAP. The educational module contains the OSCE (Appendix E), post educational questions regarding supraclavicular and femoral nerve blocks, and an evaluation tool for constructive feedback. The basis for the proposed OSCE was derived from EBP and best practice guidelines, and revisions were made based on recommendations from the feedback retrieved from the evaluation tool.

Measures

The expected impact of this OSCE was to enhance the curriculum of the NAP of USM and improve clinical outcomes for SRNAs by alleviating unneeded stresses as it relates to supraclavicular and femoral nerve blocks. Improved clinical outcomes will also increase patient satisfaction. Feedback gained from the evaluations strengthened the OSCE and will provide valuable learning experiences for SRNAs.

Data Collection and Analysis

The qualitative data needed to enhance this OSCE was collected through an evaluation tool (Appendix D) provided to the panel of fellow SRNAs, three NAP instructors, and a NAP director in an online format. Once all completed evaluation forms

were collected, the data was reviewed, analyzed, and summarized. After consultation with the committee members, revisions were made to the OSCE for supraclavicular and femoral nerve blocks utilizing ultrasound guidance for SRNAs at USM.

Ethical Considerations

One of the driving ethical considerations in all of health care is the safety of patients. With the integration of this OSCE, SRNAs will simulate patient safety in the lab before administering a nerve block in a clinical setting. Supporting evidence shows that implementing OSCEs into the nursing curriculum provides significant learning opportunities from both the educator and student perspective (Mitchell & Jeffrey, 2013). The methods used to develop the OSCE for supraclavicular and femoral nerve blocks utilizing ultrasound guidance did not result in any direct patient contact. The voluntary panel of evaluators was kept anonymous through the survey platform.

Summary

The purpose of this project was to develop an OSCE to not only improve the curriculum of the NAP at USM and the SRNA experience but ultimately provide better care for patients by knowledge obtained from its contents. This project compiled EBP data for OSCEs and best practice guidelines for supraclavicular and femoral nerve blocks. The methodology used to design and develop this OSCE meets the AACN DNP Essentials.

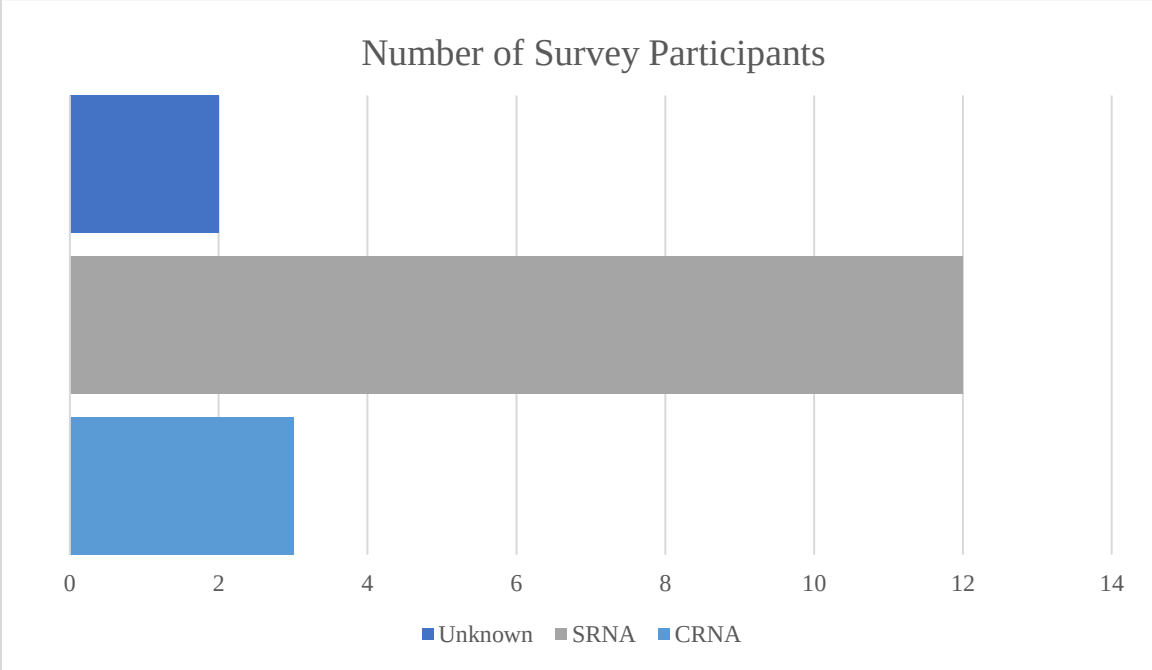
CHAPTER III – RESULTS

Participants completed an evaluation (Appendix D) of the OSCE (Appendix F). The data collection process included a survey sent to four NAP faculty at USM and 18 second-year SRNAs in the NAP at USM. The survey focused on the clarity of the OSCE and its impact on learning for those completing it. The following six topics were discussed in the survey: (1) consent to participate, (2) whether the participant was a CRNA or an SRNA, (3) determining if the OSCE was beneficial in presenting clear and exact instructions on the execution of supraclavicular and femoral nerve blocks, (4) being able to identify landmarks for the supraclavicular and femoral nerve blocks more easily after completing the OSCE, (5) whether or not the OSCE included all of the necessary information to help SRNAs be successful in the clinical arena, and (6) an open-ended question asking for recommendations or comments that would make the OSCE for supraclavicular and femoral nerve blocks easier to understand for future SRNAs.

The survey was given to each participant via email. The email contained an invitation to participate in the survey, and a link to Qualtrics, a data collection website, where the survey answers were collected anonymously. Results were collected two weeks after sending the invitations for participation, and there were 16 total participants: 11 SRNAs, three CRNAs, and two unknowns who did not specify, as shown in Table 1.

Table 1

Number of Survey Participants



The results for each question were analyzed separately. Each participant answered *yes* that the OSCE was beneficial in presenting clear and exact instructions on supraclavicular and femoral nerve blocks' execution. *Yes* was also the consensus that identifying landmarks for the supraclavicular and femoral nerve blocks was easier for the participants after completing the OSCE. Six participants included recommendations or comments. The recommendations for change included: spelling out any abbreviations, adding more background knowledge about the blocks under content review to keep the participant from having to look up any additional information, adding a *time out* at the beginning of the blocks, and identifying the needle tips on the ultrasound images. The suggestions for change in Table 2 were taken into consideration when revising the OSCE.

Table 2

Post-OSCE Review Survey Question 6 Responses from CRNAs and SRNAs

Participant	Comments/Suggestions
CRNA	• "Add Time out and Identify the needle tips on US image." • "On the Supraclavicular Nerve Block OSCE, make sure any abbreviations are spelled out the first time of use. Clear demonstration of landmarks in the video portion would be extremely helpful."
SRNA	• "This OSCE increased my knowledge of both supraclavicular and femoral nerve blocks. You guys did a good job of boiling the material down into a very concise, easy to understand chunk." • "Wonderful presentation with very beneficial information." • "I think it would be helpful to add a little bit more background knowledge under your content review to provide the student with a little more information about the blocks without having to look the information up separately. For example, the questions asked in post eval are great questions but the information to answer those questions could be concisely included in the content review. Great, great OSCE though! strong work." • "Looks great!"

Summary

The purpose of this OSCE is to ensure SRNAs have the fundamental knowledge needed to perform supraclavicular and femoral blocks successfully and safely. The objective of this DNP project is to provide a teaching tool that can be used as a way to evaluate an SRNA's competence and clinical ability. Introducing supraclavicular and femoral nerve blocks in a simulated setting allows an SRNA to be safely guided through

the process, which will improve competence for SRNAs in the clinical arena, translating to improved patient outcomes and safety.

CHAPTER IV – CONCLUSION

The purpose of this project is to develop an OSCE to not only supplement the curriculum of the NAP at USM and the SRNA experience but ultimately provide better care for patients by knowledge obtained from its contents. This project compiled EBP data for OSCEs and best practice guidelines for supraclavicular and femoral nerve blocks. The methodology used to design and develop this OSCE meets the AACN DNP Essentials.

In a simulated setting, SRNAs can learn the correct process and techniques for supraclavicular and femoral nerve blocks without fear of harming a patient, which allows students to make mistakes and learn from those mistakes in a controlled environment. This learning environment allows for SRNAs to ask questions and get immediate feedback. Along with a learning environment, open discussion without fear of recoil from a preceptor promotes confidence in SRNAs and a culture of safety for patients.

This DNP project's limitations include the number and type of participants, and being one of the first OSCEs for the nurse anesthesia program at USM. The number of participants in the survey for this OSCE was strictly based on voluntary participation. Only 18 SRNAs, three CRNAs, and one NAP program director were invited to participate in the survey. The SRNAs involved in the survey of the OSCE lacked a basis for comparison.

For future studies on OSCEs for this nurse anesthesia program, the researchers could survey first-year SRNAs who have yet to enter the clinical arena and senior-level SRNAs who have prior experience in the clinical setting as an SRNA. Having first-year SRNAs perform an OSCE could allow researchers to determine if the OSCE is beginner-

friendly. If they also choose to survey senior-level SRNAs, it could be determined if the OSCE would even be useful to do before being subjected to clinical in a hospital setting. Another suggestion would be to include more practicing CRNAs in the study. A bigger pool of current CRNAs to survey would help determine if any other changes needed to be made to an OSCE before being implemented into the curriculum of the NAP of USM.

Summary

The project's OSCE was developed using EBP guidelines and best practice guidelines for supraclavicular and femoral nerve blocks. The idea was to create a tool used for correct technique development in SRNAs in a simulated setting. In this type of environment, SRNAs will gain confidence without fear of harming patients, promoting safety. While the number of participants was limited in the evaluation of this OSCE, it is believed that enough feedback was received to revise and implement a successful OSCE into the NAP curriculum at USM.

APPENDIX A – SRNA Formative Clinical Evaluation

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Approved 9-29-17

SRNA Formative Clinical Evaluation

Name: _____ **Preceptor:** _____ **Semester/Level**_____ **Date:** _____

Clinical Site: _____ **Case(s):**_____

GRADE	SEMESTER/ LEVEL	EXPECTATIONS
S = Satisfactory	4	Disorganized, needs constant direction
U = Unsatisfactory	5	Understands basic flow of anesthetic, starting to function independently but still unable to prioritize
N/A = Not applicable/ not observed	6 & 7	Able to prioritize anesthetic and functions with minimal guidance, somewhat organized, anticipates perioperative events
	8 & 9	Organized, functions independently, properly manages anticipated and unanticipated perioperative events

KNOWLEDGE BASE	S	U	N/A	COMMENTS
Anatomy/Physiology/Pathophysiology				
Pharmacology				
Principles of Anesthesia				
Anesthetic Equipment/ Monitors				
PREOPERATIVE PREPARATION	**S**	**U**	**N/A**	**COMMENTS**
Thorough preoperative evaluation				
Diagnostic/lab data interpretation				
Pertinent evidence-based, culturally competent anesthetic plan developed				
Room set-up				
Appropriate Pre-op drugs & treatments				
ANESTHETIC MANAGEMENT	**S**	**U**	**N/A**	**COMMENTS**
Utilized and interprets monitors correctly				
Induction of anesthesia				
Maintenance of anesthesia				
Emergence from anesthesia				
Fluid/ blood management				
Proper patient positioning/ Safety				
Critical thinking				
Documentation				
Time management				
Perioperative pain management				
PACU hand-off				
PSYCHOMOTOR SKILLS	**S**	**U**	**N/A**	**COMMENTS**
Bag-mask ventilation				
Intubation technique (ETT/LMA)				
Fiberoptic/ video-assisted intubation				
Ventilator management				
Peripheral IV insertion				
Arterial catheter insertion				
Central line/PA catheter insertion				
Regional neural blockade				
Compliance with universal precautions				
PROFESSIONAL CHARACTERISTICS	**S**	**U**	**N/A**	**COMMENTS**
Accepts responsibility for actions				
Professional/ethical conduct				
Receptive to instruction				
Recognizes professional limitations				
Utilizes evidence-based approach				
Effective communication				
Performs effectively in stressful situations				
Collaborates with other professionals				

Student Signature Date Preceptor Signature Date

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

SRNA Summative Clinical Evaluation

Student Name: _____Date: _____

Preceptor Signature: _____Clinical Site: _____

1. **Student knowledge base (anatomy & physiology, pathophysiology, laboratory/diagnostic information, chemistry physics, anesthesia principles, equipment/technology)**
   - Meets or exceeds expectations for level in program (20 points)
   - Does not meet expectations for level in program (0 points)

2. **Student preoperative preparation ability (assessment, cultural competence, evidence-based practice, care plan, room set up, drugs/treatments)**
   - Meets or exceeds expectations for level in program (20 points)
   - Does not meet expectations for level in program (0 points)

3. **Student's anesthetic management of the case was based on evidence-based anesthetic practice (Induction, maintenance, emergence, safety, pain management, post-op care)**
   - Meets or exceeds expectations for level in program (20 points)
   - Does not meet expectations for level in program (0 points)

4. **Student psychomotor skills were (airway management, intubation, regional techniques, arterial and venous access techniques, universal precautions)**
   - Meets or exceeds expectations for level in program (20 points)
   - Does not meet expectations for level in program (0 points)

5. **Student professionalism (ethical/legal, receptive to instruction, interdisciplinary communication, collaboration, leadership, considers quality improvement/ cost-effectiveness, performance)**
   - Meets or exceeds expectations for level in program (20 points)
   - Does not meet expectations for level in program (0 points)

6. **Please provide additional comments that would be beneficial to the student and the NAP faculty.**

APPENDIX C – DNP Essentials

DNP Essentials	Clinical Implications
Essential I: Scientific Underpinning for Practice	Evaluation of literature related to OSCEs and nerve blocks.
Essential II: Organizational and Systems Leadership for Quality	Presentation of this project to a panel of experts to obtain feedback and suggestions to enhance the impact the OSCE will have for SRNAs.
Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice	Evaluation of literature to develop an OSCE based on the most current EBP and best practice guidelines.
Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care	The purpose of this project is to promote evidence-based practice that will lead to improved patient satisfaction through the education of SRNAs.
Essential V: Health Care Policy for Advocacy in Health Care	This essential was met by determining current best practice recommendations and incorporating them into an OSCE to assist SRNAs when preparing for clinical rotations.
Essential VI: Interprofessional Collaboration for Improving Patient and Population Health Outcomes	Collaboration with an expert panel that was selected related to their knowledge and experience with regional anesthesia.
Essential VII: Clinical Prevention and Population Health for Improving the Nation's Health	One of the goals of this project is to better educate SRNAs regarding patient safety being a priority when administering nerve blocks.
Essential VIII: Advanced Nursing Practice	This project was aimed at utilizing best practice recommendations to develop an OSCE to enrich the curriculum of a NAP for the SRNAs.

APPENDIX D – OSCE Evaluation

Evaluation of OSCE for Supraclavicular and Femoral Nerve Blocks

Thank you for evaluating this OSCE for supraclavicular and femoral nerve blocks. Participation in this evaluation is completely voluntary, however, your feedback can provide valuable information to assist SRNAs at USM for many years.

1. Do you consent to participate in the evaluation of the OSCE for supraclavicular and femoral nerve blocks?	YES	NO
2. Are you a CRNA or an SRNA?	CRNA	SRNA
3. Was this OSCE beneficial in presenting clear and exact instructions on the execution of supraclavicular and femoral nerve blocks?	YES	NO
4. After participating in this OSCE are you able to identify landmarks for the supraclavicular and femoral nerve blocks more easily?	YES	NO
5. In your opinion, does this OSCE include all of the necessary information to help SRNAs be successful in the clinical arena?	YES	NO
6. Please add any recommendations or comments that you have that would make this OSCE for supraclavicular and femoral nerve blocks easier to understand for future SRNAs.		

Comments:

APPENDIX E – 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 HAS MODIFIED THE DIRECTIVE TO HALT NON-ESSENTIAL (NO DIRECT BENEFIT TO PARTICIPANTS) RESEARCH.

PROTOCOL NUMBER: IRB-20-326
PROJECT TITLE: Objective Structured Clinical Evaluation for Supraclavicular and Femoral Nerve Blocks Utilizing Ultrasound Guidance for Student Nurse Anesthetists
SCHOOL/PROGRAM: School of LANP, Leadership & Advanced Nursing
RESEARCHER(S): Christopher Bond, Michong Bayborn, Mitchell Fowler

IRB COMMITTEE ACTION: APPROVED
CATEGORY: Expedited

Category 1. Research, conducted in established or commonly accepted educational settings, that specifically involves normal educational practices that are not likely to adversely impact students' opportunity to learn required educational content or the assessment of educators who provide instruction. This includes most research on regular and special education instructional strategies, and research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

PERIOD OF APPROVAL: August 7, 2020

Donald Sacco Jr.

Donald Sacco, Ph.D.
Institutional Review Board Chairperson

APPENDIX F – OSCE for Supraclavicular and Femoral Nerve Blocks

Anesthesia Objective Structured Clinical Evaluation for
Supraclavicular and Femoral Nerve Blocks Utilizing Ultrasound Guidance
for Student Nurse Anesthetists

LEARNER OUTCOMES:

1. Describe the proper use of the ultrasound machine to visualize landmarks
2. Be able to explain the difference between landmarks
3. Successfully deliver a local anesthetic to a specified nerve to achieve a block

DOMAINS: Clinical Skill, Formative Evaluation, & Performance Assessment

PURPOSE: Student practice and Performance Assessment

LEARNER OBJECTIVES:

1. Identify landmarks utilizing ultrasound for either supraclavicular or femoral nerve block
2. Discuss the proper procedure for administration of nerve blocks
3. Appropriately deliver local anesthetic to specified nerves

INDIVIDUAL OR GROUP OSCE: Individual OSCE; One SRNA in the simulation lab at a time precepted by a more senior SRNA, that has already participated in the OSCE and has been deemed qualified by a NAP instructor to precept other SRNAs.

REQUIRED READING and ASSOCIATED LECTURES:

1. Nagelhout: Chapter 50
2. Barash: Chapter 36
3. Butterworth: Chapter 46
4. Lecture Powerpoint – Peripheral Nerve Blocks: Upper and Lower Blocks

REQUIRED VIDEO:

Ultrasound-Guided Supraclavicular Brachial Plexus Block Video

Ultrasound-Guided Femoral Nerve Block Video

Videos used with permission from the New York School of Regional Anesthesia. https://nysora.com

REQUIRED PARTICIPANTS: Student Nurse Anesthetist (Junior Level), Student Nurse Anesthetist (Senior Level) for Formative Evaluation and Performance Assessment

VENUE: NAP Simulation Lab

STUDENT LEVEL OF OSCE: Semester 3-5

TIME ALLOTTED: 15 minutes per station

SEQUENTIAL PRACTICE & TESTING: The lab stations will be done in succession moving from Supraclavicular Nerve Block to Femoral Nerve Block. This will be a peer-led OSCE to ensure there is no intimidation thus creating a learning environment in which the junior student feels at ease to ask questions.

RECOMMENDED PRACTICE PRIOR TO EXAMINATION: 3X is recommended per station, 15 minutes each (90 min total)

CONTEXT:

Supraclavicular Nerve Block Scenario:

You are assigned to Mrs. Smith, who has been an administrative assistant for the last 35 years and is suffering from carpal tunnel syndrome and presents for surgery on her right arm. Mrs. Smith's current vital signs are as follows: HR 72 BP 123/76 RR 14 SpO2 99% RA. Mrs. Smith is considered obese (BMI 32.4) and has a medical history of hypertension and gout. Mrs. Smith takes metoprolol (last dose this morning) to control

her hypertension and allopurinol for gout. Her chest x-ray shows slight cardiomegaly and opacity in the left lower lung base. Mrs. Smith's labs are unremarkable and all values are within normal limits. The surgeon wants a nerve block to help with the surgery and also postoperative pain as well. As the nurse anesthetist for Mrs. Smith, demonstrate your knowledge of a Supraclavicular Nerve Block and perform this procedure following the steps outlined in this OSCE.

Femoral Nerve Block Scenario:

You are assigned to Mr. Jones. Mr. Jones is a 42-year-old male and is here for an ACL repair after injuring himself at a company softball game over Memorial Day weekend. Mr. Jones has no known drug allergies and is fairly healthy, however, he is overweight (BMI 32.7). Mr. Jones's last set of vital signs is as follows: HR 84 BP 132/87 RR 17 SpO2 98% RA. Mr. Jones's lab results were unremarkable and showed only elevated LDL and triglyceride levels. Mr. Jones has no surgical history, and his familial history is negative for malignant hyperthermia. Mr. Jones's chest x-ray is within normal limits with an unremarkable cardiac silhouette and clear lungs bilaterally. Because the surgeon wants Mr. Jones to be non-weight bearing after his ACL repair, a femoral nerve block is indicated. As the nurse anesthetist for Mr. Jones, demonstrate your knowledge of a Femoral Nerve Block and perform this procedure following the steps outlined in this OSCE.

EQUIPMENT & SUPPLIES:

- Gloves
- Antiseptic solution for skin disinfection (Chloraprep)
- Marking pen
- Sterile gauze
- One 1-mL syringe with a 25-gauge needle for skin wheel

- Two 20-mL syringes for local anesthetic (Supraclavicular Nerve Block)
- Two 20-mL syringes for local anesthetic (Femoral Nerve Block)
- One 50-mm, 22-gauge, short-bevel, insulated stimulating needle (Supraclavicular Nerve Block)
- One 50- to 100-mm, 22-gauge, short-bevel, insulated stimulating needle (Femoral Nerve Block)
- Surface electrode
- Peripheral nerve stimulator
- Ultrasound machine with a linear transducer (8–18 MHz), sterile sleeve, and gel

SITE SELECTION:

Supraclavicular Nerve Block- This block can either be performed in a supine or low Fowler's position, whichever is more comfortable for both the patient and the SRNA. The sternocleidomastoid muscle is identified and, the ultrasound transducer is placed transversely just above the clavicle, approximately at its midpoint and, the subclavian artery is identified. The SRNA must also identify the 1st rib to use as a reference point to avoid penetrating past this hyperechoic structure, which may cause a pneumothorax. The goal is to locate the brachial plexus, which contains the trunks of nerves C5, C6, C7, C8, & T1. (Butterworth et al, 2013. p. 981)

Femoral Nerve Block- This block is generally performed with the patient in the supine position. The femoral artery is palpated along the femoral crease. The SRNA should place the ultrasound transducer over the palpated femoral artery and move from a lateral to medial direction over the femoral artery ensuring proper imaging is obtained before inserting the insulated stimulating needle. The needle should be inserted at a 30 to 45 degree angle using a lateral to medial approach to ensure confirmation of the needle throughout the procedure.

TASK STATEMENT:

Your task is to select the appropriate area for each block, demonstrate the use of the ultrasound machine in finding the nerve bundles by identifying landmarks and layers and walk the preceptor through performing a peripheral nerve block using the ultrasound machine.

PROCESS

1. Identify patient, verify surgery, & obtain consent for regional anesthesia
2. Supplies- gather all supplies for a specific block
3. Perform timeout prior to beginning the procedure
4. Patient position- ensure comfort; administer sedative PRN
5. Identify site selection prior to obtaining US imaging
6. Properly utilize the US machine and correctly identify landmarks
7. Properly clean the area where the needle is to be inserted
8. Insert the insulated stimulating needle at the appropriate angle so that the tip is in a plane view on US imaging
9. Deliver LA to specific nerve bundles, ensuring to aspirate the needle after delivery of incremental doses monitoring the spread of the LA *bathing* the nerve bundles
10. Monitor for signs and symptoms of Local Anesthetic Systemic Toxicity (LAST)
11. Reevaluate the effectiveness of the nerve block

IMAGES:

Figure A1. *Appropriate Site Selection and Ultrasound Transducer Placement for Supraclavicular Brachial Plexus Nerve Block*

Supraclavicular brachial plexus block: transducer position just proximal the clavicle and needle insertion. Used with permission from the New York School of Regional Anesthesia. https://nysora.com

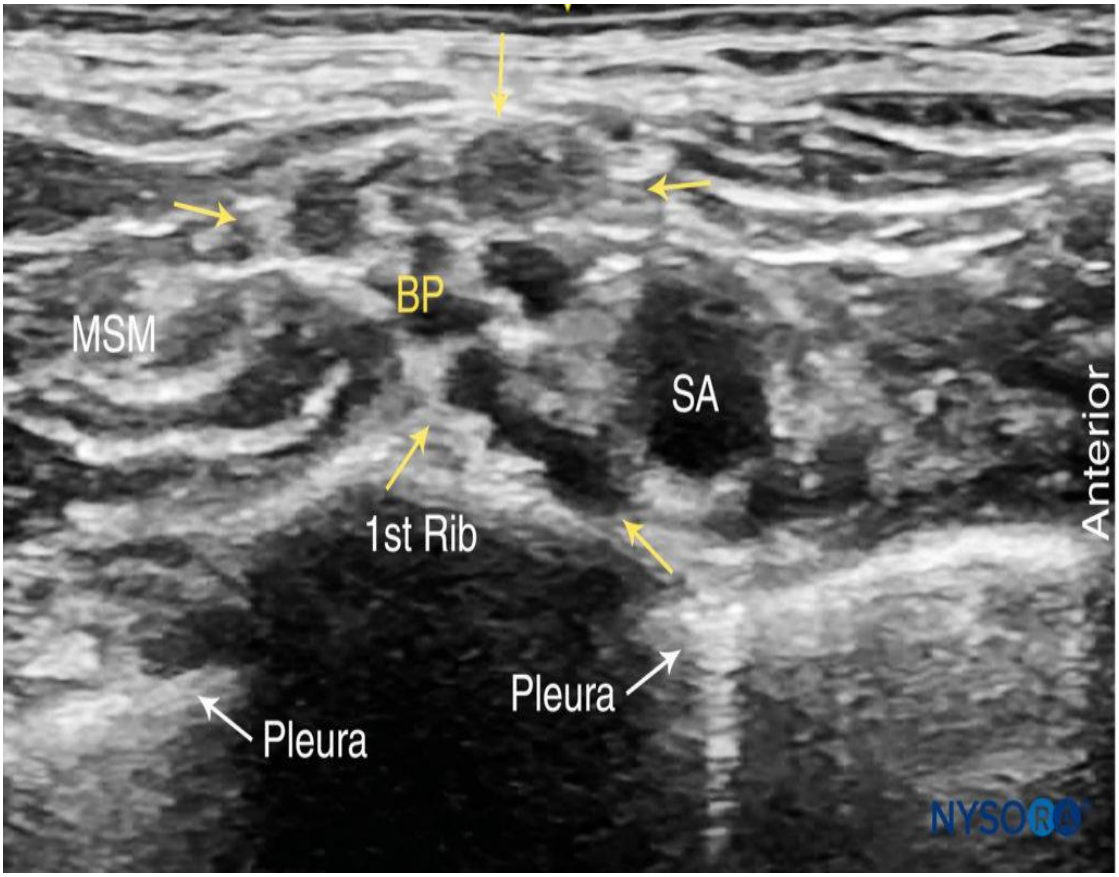


Figure A2. *Supraclavicular View of the Brachial Plexus with the Ultrasound with Identified Landmarks*

Supraclavicular brachial plexus (BP; yellow arrows) are seen as slightly superficial and posterolateral to the subclavian artery (SA). The brachial plexus is enveloped by a connective tissue sheath. Note the intimate location of the pleura and lung to the brachial plexus and subclavian artery. MSM, middle scalene muscle. Used with permission from the New York School of Regional Anesthesia. https://nysora.com

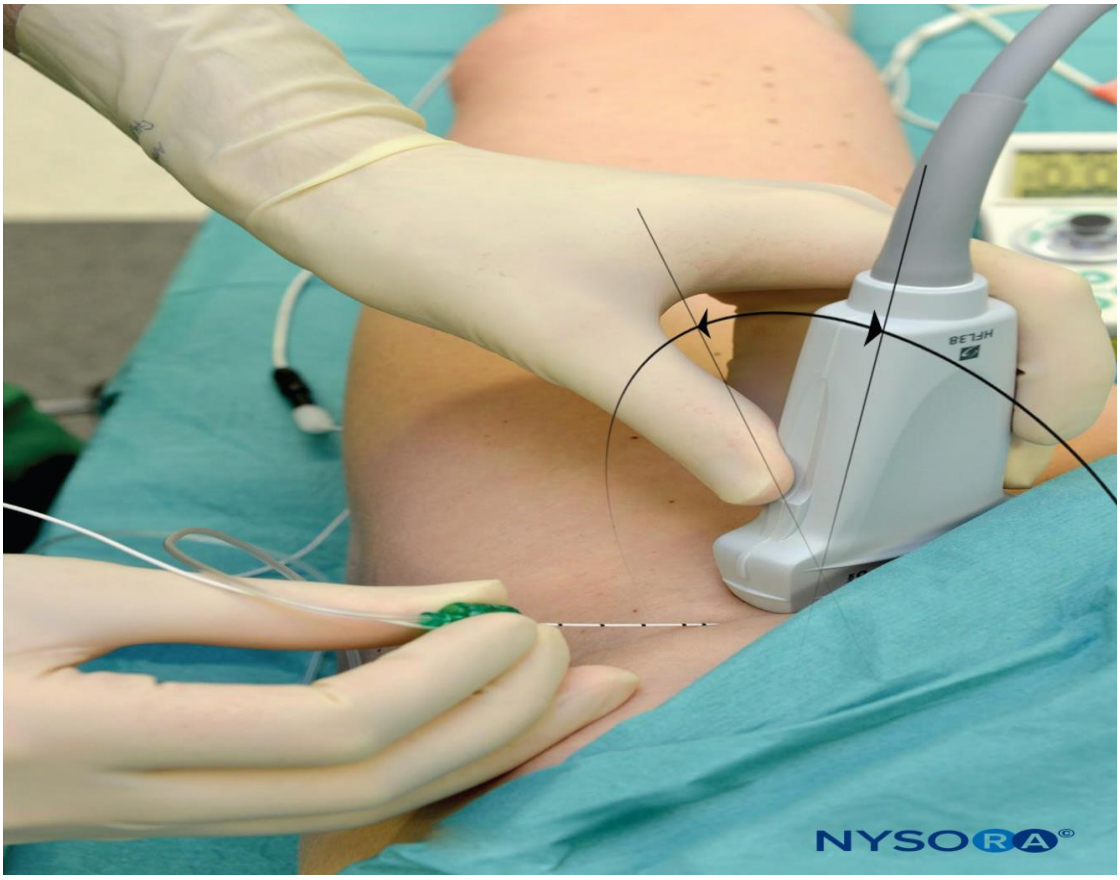


Figure A3. *Appropriate Site Selection and US Transducer Placement for Femoral Nerve Block*

Transducer position and needle insertion using an in-plane technique to block the femoral nerve at the femoral crease. Used with permission from the New York School of Regional Anesthesia. https://nysora.com

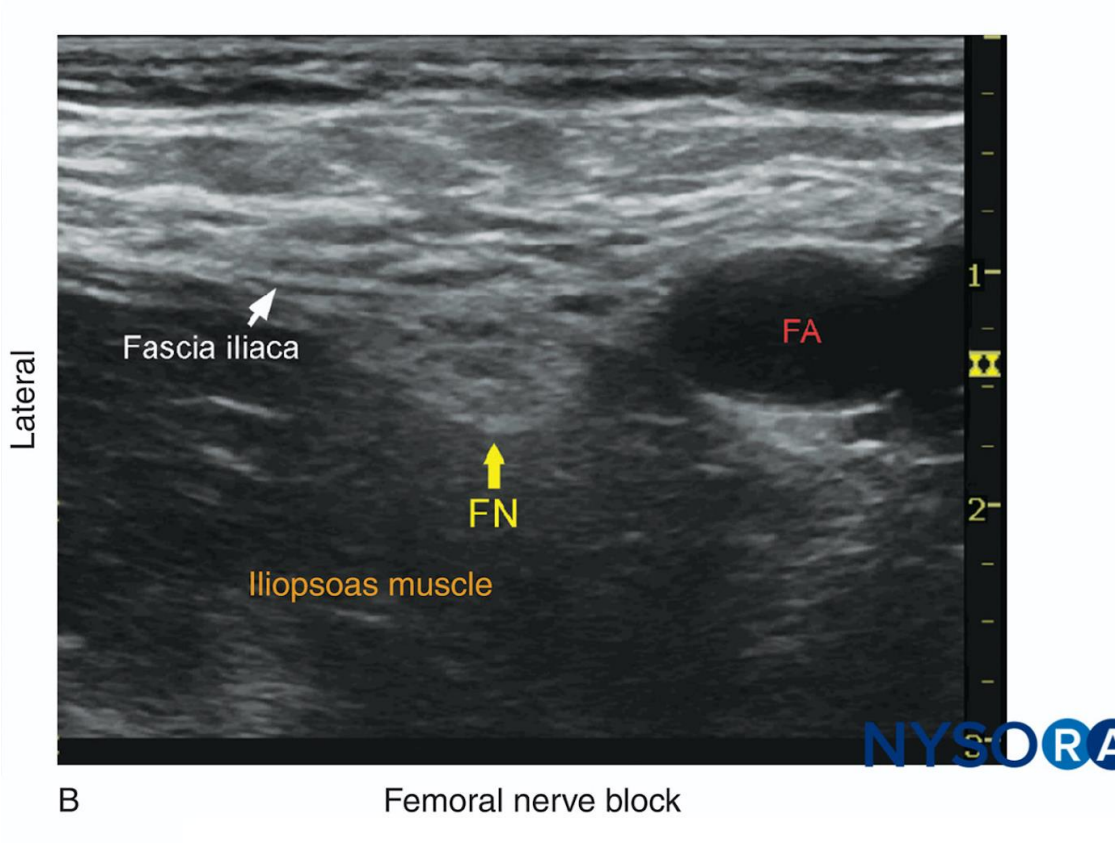


Figure A4. *Femoral Nerve View on the Ultrasound with Identified Landmarks*

Sonoanatomy of the FN at the femoral triangle. Used with permission from the New York School of Regional Anesthesia. https://nysora.com

DEBRIEFING FORM:

Supraclavicular Nerve Block:

1. Which five nerves form the brachial plexus in most individuals?
   A. C5, C6, C7, C8, & T1 (Butterworth et al, 2013. p. 981)
2. What are 5 potential risks/ complications to the supraclavicular nerve block?
   A. Pneumothorax, SA puncture, RLN palsy, Horner's syndrome, & ipsilateral phrenic nerve palsy are all potential risks/ complications when performing supraclavicular nerve blocks. (Butterworth et al, 2013. p. 988)
3. What is the major advantage of the supraclavicular approach to the brachial plexus?
   A. When utilizing the supraclavicular approach, the trunks of the 3 nerves of the brachial plexus are compactly arranged in this area and there is a minimal possibility of missing the nerve branches as it relates to LA spread. (Barash et al, 2017. p. 970)

Femoral Nerve Block:

1. The femoral nerve block provides adequate postoperative analgesia for what areas?
   A. Hip, thigh, knee, and ankle. (Butterworth et al, 2013. p 1002)
2. At what angle does the clinician insert the needle when administering a femoral nerve block?
   A. An acute 30 to 45-degree angle should be used to maximize viewing. (Barash et al, 2017. p. 988)
3. What direction does the clinician insert the needle when administering a femoral nerve block?
   A. The needle should be inserted lateral-to-medial to ensure that the femoral nerve is reached before encountering the femoral vessels. (Barash et al, 2017 p. 989)

ASSESSMENT QUESTION AND DEMONSTRATION STATION:

	TASKS	PASS	FAIL
*	1. Performs Timeout (Identifying patient and procedure along with the informed anesthesia consent); Prepares and selects appropriate equipment		
	2. Ensures patient positioning for procedure		
	3. Demonstrates proper use of ultrasound machinery		
	4. Identifies site selection with proper antiseptic application		
*	5. Identifies landmarks and structures appropriately on the image provided		
*	6. Demonstrates the proper angle of insertion of stimulating needle for an “in-plane” view		
*	7. Maintains confirmation of needle tip throughout the procedure		
*	8. Identifies adequate spread of LA next to nerve bundles after aspirating to ensure the needle tip is not in an artery or vein		
	9. Assesses patient for signs and symptoms of LAST		
	10. Appropriately cleans machinery and returns it to the original location		
	11. Re-evaluates effectiveness of the nerve block		

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 for an adequate nerve block: (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 G – Literature Matrix

Author/Title/Journal	Type of Evidence/ Level of Research	Summary
Ballister, 2018	Journal Article/ Level IV	Overview of the basics of an OSCE and how to perform a needs assessment. Describes formative and summative OSCEs.
Harden & Gleeson,1979	Journal Article/ Level II	Study of the introduction of objective structured clinical exams into the curriculum.
Ironfield et al, 2014	Quantitative Review/ Level III	A review of patients' satisfaction, where 61.6% of 9969 patients were surveyed after receiving regional anesthesia. 94.6% of those patients were satisfied and would undergo a peripheral nerve blockade again.
Lambert et al, 2014	Literature Review/ Level V	Discusses the definition of "adult" as it pertains to learning and lists three ways that adults learn best: visually, auditorily, and kinesthetically.

Mitchell & Jeffrey, 2013	Experiment Review Article/ Level I	Has evidence to prove that the implementation of OSCEs into the nursing curriculum provides effective learning opportunities for both educators and students in a nationwide evaluation across AUS.
Stone, 2012	Journal Article/ Level IV	Explains stressors of SRNAs and their educators, and factors that play into the stress.
Wildgust, 1986	Journal Article/ Level III	The first-of-its-kind study of stress in SRNAs; discusses not removing all stress, but creating a learning environment in which students can react in a positive way.
Zayyan, 2011	Journal Article/ Level V	Explains the origins of the OSCE and how they continue to evolve into a multipurpose evaluation tool.

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