Certificate in Clinician Performed Ultrasound

(CCPU)

Syllabus

Upper Limb Peripheral Nerve Blocks

Australasian Society for Ultrasound in Medicine
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ACN 001 679 161 **ABN** 64 001 679 161

Upper Limb Peripheral Nerve Blocks

Purpose

Ultrasound guidance for regional anaesthesia targeting nerves from the forearm to supracondylar region. Cover principles of ultrasound guided regional blocks in the Emergency Department, ICU or Operating Theatres for limb analgesia and anaesthesia.

Upper limb nerve blocks include:

- Median nerve block
- Ulnar nerve block
- Radial nerve block

Prerequisites

CCPU candidates engaged in ultrasound assessment of patients must:

- Enrol in the CCPU.
- Review ASUM Code of Conduct and Safety Policies.
- Complete the ASUM CCPU online physics tutorial quiz.
- Attend a CCPU accredited course.
- Self-directed learning before and ongoing includes understanding specific details, indications, and contraindications for the range of procedures that they perform. This includes asepsis and use of the various needles and catheter techniques.

*Please note that separate modules exist for the Erector Spinae block, Paravertebral block, Proximal Brachial Plexus block, Upper Limb Peripheral Nerve block and Fascia Iliac block

Course Objectives

- Relate CCPU Upper Limb Peripheral Nerve Blocks to peer-reviewed literature and published protocols or standards of practice.
- **Neurological examination** before and after the procedure and its documentation.
- Knowledge of the **pharmacology of common local anaesthetic drugs**, for example, ropivacaine, bupivacaine and lidocaine.
    - Toxic doses, onset and duration of action.
    - Awareness that local anaesthetics are often available in multiple concentrations.
    - Knowledge of new and emerging medications.
- Knowledge of **local anaesthetic toxicity (LAST)**.
    - Signs, symptoms, and treatment algorithms of LAST.
- Indications and contraindications to the use of the local anaesthetic.
- **Local guidelines** inform decision-making related to nerve block techniques. Discussion of these local guidelines and impact on admitting services, for example, Orthopaedic and Trauma.
    - In case of admission to the hospital follow-up planning (Acute Pain Service consultation) for ongoing analgesia.
    - Follow-up after catheter insertion, typically admitting team and Acute Pain Service.
    - On discharge: relevant and appropriate discharge instructions and precautions.
- Demonstrate competency in ultrasound-guided regional anaesthesia of the upper limb.
- Describe the limitations of ultrasound in assessing the upper limb.
- Demonstrate appropriate ongoing patient management as a result of ultrasound findings and interventions in conjunction with other clinical information.
- Document ultrasound findings in the patient's clinical record to facilitate continuity of care.
- Document ultrasound-guided regional anaesthesia procedure.
- Understand ultrasound technique and physical principles of peripheral nerve blocks

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- Proficiency in image optimisation to enable appropriate procedural guidance.
- Understand ultrasound anatomy, surface anatomy and common variants including relationships to adjacent structures.
- Develop ultrasound needle finding and guidance skills in-plane and out-of-plane.

Course Content Requirements

Anatomy

Nerves of the upper limb:

- Median nerve
- Ulnar nerve
- Radial nerve

Blood vessels of the upper limb:

- Brachial artery and vein
- Radial artery
- Ulnar artery

Preparation for the procedure

- Neurological examination and documentation pre-procedure
- Check for relevant allergies
- Consent
- Equipment preparation:
    - Aseptic technique, sterile probe cover and application
    - Local anaesthetic choice, concentration, dose, and administration
    - Needle options and selection
- Patient, operator, machine and equipment position
- Patient comfortable and limb appropriate positioning
- Identification of safe and effective approach with preliminary scan
- Operator comfort and ergonomics

Technical Skills

- Aseptic technique
- Decide on in-plane or out-of-plane technique
- Optimise image of nerve
- Optimise image of needle
- Hydrodissection

Limitations and Pitfalls

- Cooperative patient with informed consent
- Patients' ability to achieve and maintain appropriate positioning
- Patient body habitus
- Variable anatomy
- Avoiding adjacent blood vessels
- Puncture of nerve
- Loss of needle visualisation

Expected standards of practice CCPU Upper Limb Peripheral Nerve Blocks

Learners should have a robust knowledge of the pharmacology of common local anaesthetic agents, including:

- Pharmacodynamics, especially onset and duration
- Indications and contraindications
- Toxic doses

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- Knowledge of local anaesthetic toxicity (LAST) Including clinical features and treatment algorithms

Learners should be able to recall and understand the risks of regional anaesthesia, including:

- Cardiovascular collapse
- Impaired consciousness
- Seizures
- Hypotension
- Allergic reaction
- Infection
- Haematoma
- Nerve damage
- Failed block

Learners should be able to demonstrate 'time out' procedure and other mechanisms to avoid wrong site block with verification of:

- Patient
- Site and side
- Consent
- Marked block site

Learners should be able to discuss the impact of coagulation status and anticoagulation medications.
Proficiency in the neurological examination and documentation of target anatomy before and after the procedure.
Proficiency in image optimisation affecting procedural guidance
Awareness of adjuvant agents and therapies

Minimum expected ultrasound data acquisition/protocols:

Preparation

- Prepare clinical environment.
- Prepare patient, including informed consent where possible (refer to ASUM code of conduct) in line with state and hospital/practice policy.
- Select and prepare ultrasound and ancillary equipment in line with ASUMs safety policies.
- Enter patient data into ultrasound equipment.

Image acquisition

- Acquire and optimise ultrasound images/data
- Identify relevant anatomical features and landmarks
- Identify and respond to ultrasound artifacts, if required, to improve diagnostic quality of images/data.

Minimal recorded images/ultrasound data

The following are the required minimal images to be recorded, unless the patient's clinical situation (for example clinically relevant example e.g. during CPR) renders this impracticable and/or unsafe. In this situation, the practitioner should record whatever images are obtainable, in the time available, to answer the clinical question without allowing the ultrasound examination to interfere with ongoing medical treatment.
Awareness of and compliance with local protocol. If relevant - images should be saved as cineloop or real-time recordings.

- Identification of course of target nerve and local blood vessel
- Pre-needle insertion, post-needle insertion, and post-anaesthetic injection surrounding target nerve

Sonographic appearances of expected positive, negative, and equivocal findings

- Describe ultrasound appearances using correct sonographic terminology
- Identify and describe conclusive findings, positive or negative

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- Identify limitations of an examination, including specific examples/situations if appropriate
- Identify the relevance of equivocal findings

Integration of ultrasound findings with clinical information

- Describe relevance of ultrasound findings correlated to clinical presentation and other data
- Integrate information with ongoing clinical management of patient

Post examination

- Ensure examination and findings adequately recorded in patient clinical record
- Clean ultrasound equipment safely and correctly as per ASUM Safety Protocols
- Store ultrasound equipment safely and correctly.
- Observe the patient for complications, toxicity, and pain score
- Acute pain service review if appropriate and available
- Discharge instructions for the patients that are discharged post-procedure

Training

- Recognised through attendance at an ASUM accredited course.
- Evidence of satisfactory completion of a training course required for unit award.

Teaching Methodologies for the CCPU Upper Limb Peripheral Nerve Blocks

All courses accredited toward the CCPU will be conducted in the following manner:

- Learners will receive reference material covering the course curriculum.
- A pre-test to focus learners on main learning points.
- Each course shall comprise at least two (2) hours of teaching time of which at least one (1) hour shall be practical teaching. Stated times do not include the physics, artefacts, and basic image optimization which should be provided if delegates are new to ultrasound.
- Lectures should cover substantially the same material as this CCPU curriculum.
- An appropriately qualified clinician involved in development and teaching the course and must be present for the course itself.
- Live scanning sessions for this unit shall include sufficient live patient models to ensure that each candidate has the opportunity to scan (maximal candidate: tutor/machine ratio of 5:1). Models will include normal subjects and patients with appropriate pathologies. Patient simulations may be approved at the discretion of the CCPU Board.
- A compulsory post-test will be conducted at the end of the course to ensure the required learning objectives are met.

Assessments

- Two (2) formative assessments of clinical skills, specifically related to the assessment of the Upper Limb Peripheral Nerve Blocks examination.
- One (1) summative assessment of clinical skills, specifically related to the assessment of Upper Limb Peripheral Nerve Blocks.

All assessments are to be performed under the supervision of the Primary Supervisor using the competence assessment form supplied at the end of this document and completed on ADULT patients ONLY.

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Please refer to section 8 of the CCPU Regulations for information regarding timing and exclusion of these assessments in the logbook.

Logbook Requirements

- Five (5) upper limb nerve block procedures (successful and directly supervised) for those new to regional nerve blocks.
- Three (3) upper limb nerve block procedures (successful and directly supervised) for those already competent at regional nerve blocks.
- All nerve blocks must be indicated and performed in a clinical environment.
- All logbook scans must be real-time scans. Simulators are not allowed to perform scans.
- All logbook cases must be signed off by a suitably qualified supervisor (see section 6.0 of the CCPU Regulations)
- The 'Comparison with Further Imaging or Clinical Outcome' column should describe the outcome of the block for example successful, partial block or failure of block.
- At the discretion of the ASUM CCPU Certification Board candidates may be allowed an alternative mechanism to meet this practical requirement.
- Those cases that involve a procedural component must be signed off by a suitable assessor who performs regional upper limb nerve blocks.

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ASUM CCPU Competence Assessment Form

CCPU Upper Limb Peripheral Nerve Blocks

Candidate: _____

Assessor: _____

Date: _____

Assessment type: **Formative 1** (feedback & teaching given during assessment for education) ☐
Formative 2 (feedback & teaching given during assessment for education) ☐

		Competent	Prompted	Fail
Prepare patient				
	Position			
	Informed consent			
	Allergies confirmed			
Prepare Environment				
	Lights dimmed if possible			
Probe & Preset Selection				
	Can change transducer			
	Selects appropriate transducer			
	Selects appropriate preset			
Data Entry				
	Enter patient details			
	Document nerve examination			
Image Acquisition				
	Optimisation (depth, frequency, focus, gain)			
Identifies				
	Brachial artery			
	Radial artery			
	Ulnar artery			
	Radial nerve			
	Ulnar nerve			
	Median nerve			
Describes appearance & pathology		**Competent**	**Prompted**	**Fail**
	Needle insertion technique			
	Depth			
	Angle			
	Injection of local anaesthetic			
	Amount			

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Hydro visualisation of the nerve			
Anatomical spread			
Identifies and complication			

Artefacts

Identifies & explains the basis of common artefacts			

Record Keeping

The anatomical structures			
Pre needle insertion			
Post needle insertion			
Post anaesthetic injection			
Describe findings briefly			
Integrates ultrasound findings with clinical assessment and explains how the findings might change			
Block and analgesia			

Machine Maintenance

Cleans / disinfects ultrasound probe			
Stores machine and probes correctly			

Feedback of particularly good areas: _____

_____

_____

Agreed actions for development: _____

_____

_____

*Once the candidate has met the minimum assessment and logbook criteria (5 if new to peripheral upper limb nerve blocks, 3 if experienced) the examiner may choose to recommend the candidate to the CCPU board for credentialing in Upper Limb Peripheral Nerve Blocks CCPU.

Examiner signature: _____ Candidate signature: _____

Examiner name: _____ Candidate name: _____

Date: _____

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ASUM CCPU Competence Assessment Form

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Candidate: _____

Assessor: _____

Date: _____

Assessment type: **Summative** (prompting allowed but teaching not given during assessment) □

To pass the summative assessment, the candidate must pass all components listed:

	Competent	Prompted	Fail
Prepare patient			
Position			
Informed consent			
Allergies confirmed			
Prepare Environment			
Lights dimmed if possible			
Probe & Preset Selection			
Can change transducer			
Selects appropriate transducer			
Selects appropriate preset			
Data Entry			
Enter patient details			
Document femoral nerve examination			
Image Acquisition			
Optimisation (depth, frequency, focus, gain)			
Identifies			
Anatomy Brachial artery			
Anatomy Radial artery			
Anatomy Ulnar artery			
Anatomy Radial nerve			
Anatomy Ulnar nerve			
Anatomy Median nerve			

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	Competent	Prompted	Fail
Describes appearance & pathology			
Needle insertion technique			
Depth			
Angle			
Injection of local anaesthetic			
Amount			
Hydro visualisation of the nerve			
Anatomical spread			
Identifies and complication			
Artefacts			
Identifies & explains the basis of common artefacts			
Record Keeping			
The anatomical structures			
Pre needle insertion			
Post needle insertion			
Post anaesthetic injection			
Documents focussed scan only			
Describe findings briefly			
Integrates ultrasound findings with clinical assessment and explains how the findings might change management			
Block and analgesia			
Machine Maintenance			
Cleans / disinfects ultrasound probe			
Stores machine and probes correctly			

Supervisor Declaration

*Once the candidate has met the minimum assessment and logbook criteria (5 if new to peripheral upper limb nerve blocks, 3 if experienced) the examiner may choose to recommend the candidate to the CCPU board for credentialing in Upper Limb Peripheral Nerve Blocks CCPU.

I _____(supervisor name) am satisfied that _____(candidate's name) has demonstrated the minimum requirement for competency in Upper Limb Peripheral Nerve Blocks on _____(date).

Supervisor signature: _____

Candidate signature: _____

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