



## Fellowship in Anaesthesia: Curriculum of the College of Anaesthesiologists of East, Central and Southern Africa

Education Committee | FCA(ECSA) | 2020

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## 1. Introduction

1.1. Background: CANECSA is the College of Anaesthesiologists of East, Central and Southern Africa. Constituent member countries are members of the East Central and Southern Africa Health Community (ECSA). Sub-Saharan Africa suffers from an immense shortage of anaesthesiologists, safe anaesthesia services and anaesthesia training resources. CANECSA aims to address this by harnessing training capacity through College-based Fellowship training across East Central and Southern Africa.

The need to make anaesthesiology training in the region of high and uniform quality led to the idea of a College of Anaesthesia across East, Central and Southern Africa, mirroring the success of the College of Surgeons, being presented to ECSA Ministers of Health at a meeting in Zimbabwe in 2008/2009.

1.2. Goal: The goal of the training program is to produce anaesthesiologists who will provide a safe and quality care to their patients from their beginning in clinical training, and leadership in the organization and development of anaesthesia services.

1.3. Educational Philosophy: Modern medical and health professions education emphasises learner and patient-centredness in an outcomes-based curriculum. These are the underlying threads of this anaesthesiology training programme. (see Fig 1)

1.4. Course Outline: This Fellowship of the College of Anaesthesiologists of East, Central and Southern Africa (FCA(ECSA)) will be over a minimum of four years. The training is conducted in two parts: Part I, consisting of Basic Training covering the first two years after which the trainee is then eligible to sit for the Part I examinations. The last two years constitute the Part II and comprise Advanced Clinical training, following which the trainee is eligible to sit for the Part II examinations.

1.5. The programme runs over at least four years, with key competency levels as follows:

- 1.5.1. Level 1 (0-6 months): Has knowledge of, describes...
- 1.5.2. Level 2 (6-12 months): Performs, manages, demonstrates under supervision
- 1.5.3. Level 3 (12-24 months): Performs, manages, demonstrates independently
- 1.5.4. Level 4 (24-48 months): Teaches or supervises others in performing, managing, demonstrating.
- 1.6. The Fellowship program aims to train an anaesthesiologist for a broad range of specialist practice. More focused training is achieved through post-Fellowship sub-specialty training such as Paediatric Anaesthesia, Cardiac Anaesthesia, Neuroanaesthesia etc.

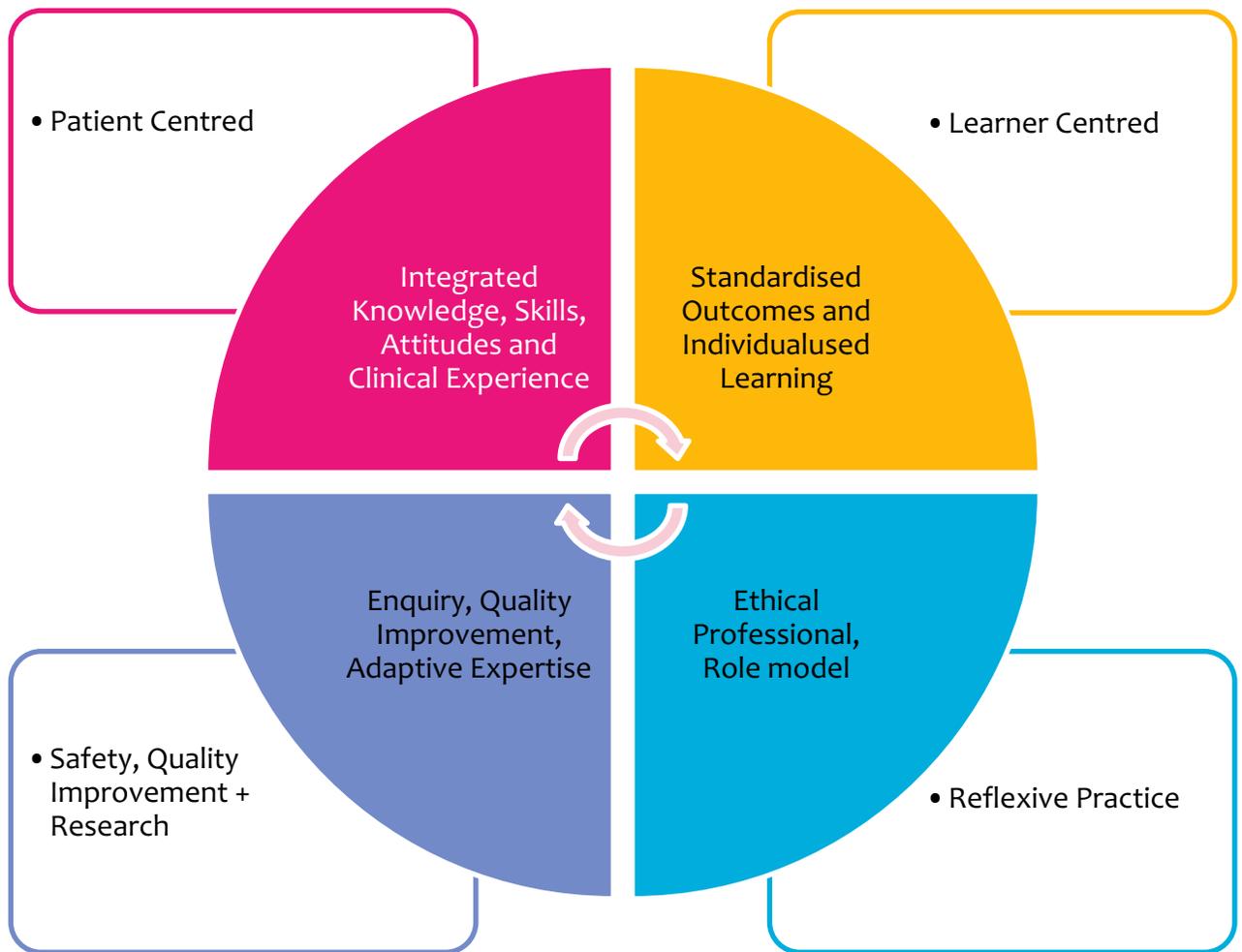


Fig 1.

## 2. Course Structure

- 2.1. **Basic Training** consists of acquisition of foundational knowledge, skills and attitudes of an anaesthesiologist. The overall Learning Objectives in Basic training are the following:
  - 2.1.1. Conducting safe general anaesthesia and perioperative care for patients where risk is considered low
  - 2.1.2. Understanding physiology, pharmacology, clinical measurement, and monitoring as applied to anaesthesia, as part of perioperative assessment
  - 2.1.3. Understanding the principles of acute pain management
  - 2.1.4. Conducting safe procedural sedation
  - 2.1.5. demonstrating a professional team approach with patients, families, colleagues and staff
  - 2.1.6. Appraising evidence-based approaches to clinical problems
  - 2.1.7. Developing and demonstrating the attitudes of self-directed learning
- 2.2. The teaching and learning of the basic science of anaesthesia are, as far as is possible integrated with patient care and clinical context. Basic Sciences of anaesthesiology comprise (see Appendix I):
  - 2.2.1. *Physics* of clinical measurement, monitoring, anaesthetic equipment and the physical environment.
  - 2.2.2. *Anatomy* in anaesthesia practice
  - 2.2.3. *Physiology* in anaesthesia practice
  - 2.2.4. *Pharmacology* in anaesthesia practice
- 2.3. Trainees will be expected to demonstrate skills in perioperative assessment, conduct of the anaesthesia and performance of essential skills in the safe management of uncomplicated elective and emergency patients (Appendix II).
- 2.4. Trainees clinical experience should extend across a broad range of disciplines, eg general surgery, obstetrics, gynaecology, orthopaedics, urology,
- 2.5. Trainees will be expected to demonstrate understanding and appropriate use of equipment encountered in anaesthesia (Appendix III)
- 2.6. Throughout training principles of professionalism and ethics will be integrated into the teaching, learning and practice.
- 2.7. **Advanced Training** will consist of development and consolidation of higher skills and knowledge in the following:
  - 2.7.1. Obstetric Anaesthesia and Obstetric Analgesia,
  - 2.7.2. Cardiothoracic Anaesthesia,
  - 2.7.3. Neuroanaesthesia
  - 2.7.4. Major Surgery, Emergency and Trauma Care,
  - 2.7.5. Head and Neck Surgery (ENT, Eyes, Dental, Maxillofacial etc)
  - 2.7.6. Critical Care Medicine

- 2.7.7. Pain Medicine
- 2.7.8. Regional Anaesthesia
- 2.8. Concurrent with the development of these skills will be courses on research methods, writing for publication, critical appraisal and reviewing for publication paper. Evidence of these skills will be expected, in the form of a portfolio of participation in research activities, publication of audits, critical appraisals, literature reviews and others.
- 2.9. Teaching others is a skill Trainees will be expected to demonstrate. Concurrent with all the modules will be sessions in how to learn and how to teach others, as well as keeping a record of learning and teaching.

### 3. Basic Training

*Introduction to Anaesthesia* [3 months] It is important that the trainee demonstrate that they can safely manage an anaesthetic patient, by demonstrating safe clinical practice and the principles of safe practice. This is important for the patient and the trainee, who needs to develop confidence and competence during training. Trainees should be assessed before proceeding to more complex and increasingly autonomous practice.

#### 3.1 Perioperative assessment:

- 3.1.1 Taking a history
- 3.1.2 Clinical examination of patient
- 3.1.3 Focused investigations
- 3.1.4 Focused pre-anaesthetic evaluation
- 3.1.5 Consent and communication with patient and family
- 3.1.6 Premedication
- 3.1.7 Choice of anaesthetic, anaesthetic care plans and conduct of anaesthesia
- 3.1.8 Induction of general anaesthesia
- 3.1.9 Induction of regional anaesthesia
- 3.1.10 Intraoperative care
- 3.1.11 Post-operative care and care plans
- 3.1.12 Recovery hand over and recovery room care
- 3.1.13 Perioperative management of emergency patients
- 3.1.14 Infection control
- 3.1.15 Management of anaesthetic emergencies including cardiac arrest in adults and children, hypotension, hypoxaemia

3.2 Foundation Training: [up to 21 months] This follows the 'Introduction to Anaesthesia' and affords a broad experience of anaesthesia practice, knowledge and skill acquisition and development of the professional attributes of an anaesthetist, medical and health professional. The training can be delivered as rotations or as longitudinal clerkships, providing good documentation is maintained and learning objectives are met. Key competencies must be gained in the management of:

- 3.2.1 Airway management
- 3.2.2 Obstetrics
- 3.2.3 Orthopaedic surgery
- 3.2.4 General surgery
- 3.2.5 Paediatric
- 3.2.6 Urological and gynaecological surgery

- 3.2.7 Head, neck, maxillo-facial and dental surgery
- 3.2.8 Acute Pain medicine
- 3.2.9 Intensive care medicine
- 3.2.10 Day surgery
- 3.2.11 Critical incidents
- 3.2.12 Out of theatre [Pain team, critical care out-reach, anaesthetic clinics, patient transfer team, teaching]
- 3.2.13 Perioperative medicine
- 3.2.14 Regional Anaesthesia
- 3.2.15 Sedation
- 3.2.16 Patient transfer medicine
- 3.2.17 Trauma and resuscitation

#### **4. Advanced Training**

Training at this level is a i) synthesis of skills and knowledge developed since basic training for the management of complex cases, and ii) demonstrating competencies in the following subspecialties of anaesthesia: neuroanaesthesia, paediatric anaesthesia, critical care medicine and cardiac anaesthesia. In addition, trainees should develop and demonstrate knowledge, skills and professional behaviour to a high level. Trainees are expected to share knowledge, participate in teaching and learning activities with junior trainees, peers, other health professionals, patients, their relatives and families. Good communication skills and a collaborative relationship with others, resource management, leadership and advocacy are some of the qualities to be demonstrated.

##### 3.3 Neuroanaesthesia:

- 3.3.1 Provide safe peri-operative anaesthetic care to complicated adult patients requiring complex elective intra-cranial and spinal surgery and neuroradiological investigations under direct supervision.
- 3.3.2 Provide safe peri-operative anaesthetic care to complicated adult patients for emergency non-complex intracranial and spinal surgery with indirect supervision [i.e. craniotomy for acute sub-dural / acute decompressive lumbar laminectomy] Lead the resuscitation, stabilisation and transfer of adult patients with brain injury

##### 3.4 Cardiothoracic Anaesthesia:

- 3.4.1 Provide safe perioperative anaesthetic care to complicated adult patients requiring elective aortic or mitral valve surgery under direct supervision
- 3.4.2 Provide safe perioperative anaesthetic care to complicated adult patients requiring open resection of lung tissue under local supervision
- 3.5 Critical Care Medicine: Critical care competencies must be acquired throughout the programme and across all training modules.
  - 3.5.1 Recognises, assesses, makes initial diagnosis, prioritises, resuscitates and manages acutely and critically ill patient
  - 3.5.2 Monitors, investigates, initiates organ support, manages pre and postoperative high risk patients and manages pain and continuity of care.
  - 3.5.3 Discusses end of life care, palliative care and withholding/withdrawal of life support with care team and family.
  - 3.5.4 Demonstrates understanding of administrative and managerial responsibilities, infection control, ICU admission and discharge processes, handover and continuity of care.
- 3.6 Remote and rural anaesthesia: Much of the population in Africa has limited access to safe surgery because of distance from services, difficult to reach environments and limitations in resources for health care. However, health professionals and service providers must be able to develop programs and plans to reach, rescue and retrieve.
  - 3.6.1 Modify and adapt the knowledge, skills and understanding of administering general and regional anaesthesia to include a focus on the special difficulties presented by the remote and rural setting.
  - 3.6.2 Apply will include developing knowledge, skills and experience of the managing critical care services in a multidisciplinary team setting where resource may be limited.
  - 3.6.3 Develop an understanding of and skills in transfer medicine (paediatric and adult), neonatal resuscitation, chronic pain and palliative care suitable for a remote and rural location practice.
  - 3.6.4 Demonstrate independence, resourcefulness, initiative and problem solving abilities in managing all clinical and management issues.

- 3.6.5 Deliver perioperative anaesthetic care to patients in the remote and rural setting, including resuscitation, stabilisation and transfer of patients to the referral centre (air transfer by helicopter or fixed wing, road transfer).
- 3.6.6 Be an effective team member for delivery of acute services within a remote and rural centre.

## Appendix I

### 1. **Basic Sciences Syllabus**

#### 1.1. *Physiology*

- 1.1.1. Cardiovascular
- 1.1.2. Respiratory
- 1.1.3. Metabolism
- 1.1.4. Acid-base
- 1.1.5. Fluid exchange and loss
- 1.1.6. Blood and tissue electrolytes
- 1.1.7. Kidney
- 1.1.8. Liver
- 1.1.9. Central nervous system
- 1.1.10. Neuromuscular junction
- 1.1.11. Muscle
- 1.1.12. Autonomic nervous system
- 1.1.13. Pain and nociception
- 1.1.14. Temperature control
- 1.1.15. Endocrine
- 1.1.16. Coagulation
- 1.1.17. Gastrointestinal function
- 1.1.18. Pregnancy, neonate and child
- 1.1.19. Old age

#### 1.2. *Pharmacology*

- 1.2.1. Basic pharmacokinetics
- 1.2.2. Principles of pharmacodynamics
- 1.2.3. Transplacental passage of drugs
- 1.2.4. Drugs used in premedication
- 1.2.5. General anaesthetics and theories of anaesthesia
- 1.2.6. Local anaesthetics/analgesics
- 1.2.7. Neuromuscular blocking drugs and their antagonists
- 1.2.8. Antimuscarinics
- 1.2.9. Opioids and antagonists
- 1.2.10. Other analgesics
- 1.2.11. Hypnotics and anxiolytics, and antagonists
- 1.2.12. CNS stimulants

- 1.2.13. Control of nausea and vomiting
- 1.2.14. Antacids
- 1.2.15. Cardiovascular drugs
- 1.2.16. Inotropes
- 1.2.17. Diuretics
- 1.2.18. Antiarrhythmics
- 1.2.19. Adrenergics and antiadrenergics
- 1.2.20. Anti-hypertensives
- 1.2.21. Nitrates and calcium channel blocking drugs
- 1.2.22. Nitric oxide
- 1.2.23. Sympathomimetics
- 1.2.24. Compounds affecting coagulation and haemostasis
- 1.2.25. Vitamin K antagonists
- 1.2.26. Antiplatelet drugs
- 1.2.27. Fibrinolytics/antibrinolytics
- 1.2.28. Respiratory agents
- 1.2.29. Bronchodilators
- 1.2.30. Respiratory stimulants
- 1.2.31. Oxygen
- 1.2.32. Carbon dioxide
- 1.2.33. Drugs used for diabetes
- 1.2.34. Thyroid and antithyroid drugs
- 1.2.35. Corticosteroids
- 1.2.36. Antibiotics
- 1.2.37. Blood, blood components and blood substitutes
- 1.2.38. Common drug interactions
- 1.2.39. Mechanism and management of anaphylaxis
- 1.3. Physics and Measurement
  - 1.3.1. Behaviour of gases. Detection
  - 1.3.2. Temperature measurement
  - 1.3.3. Measuring acid-base balance, oxygen and CO<sub>2</sub> in blood, gas and tissues
  - 1.3.4. Cardiac output; blood flow; pressure
  - 1.3.5. Pulmonary function
  - 1.3.6. Gas volumes
  - 1.3.7. Renal function
  - 1.3.8. Hepatic function
  - 1.3.9. Neuromuscular blockade

- 1.3.10. CNS electrical activity; arousal
- 1.3.11. Basic statistics
- 1.4. Anatomy
  - 1.4.1. Nose
  - 1.4.2. Mouth
  - 1.4.3. Pharynx
  - 1.4.4. Larynx
  - 1.4.5. Lungs and their relations
  - 1.4.6. Heart, arteries and veins
  - 1.4.7. Relevant anatomy of regional anaesthesia and commonly used nerve blocks

## Appendix II

### 2. *Perioperative assessment and preparation*

#### 2.1. Preoperative assessment

- 2.1.1. Disease and drug therapy
- 2.1.2. Assessment of risk
- 2.1.3. Preparation of patients
- 2.1.4. Preoperative information of patients
- 2.1.5. Preoperative medication
- 2.1.6. General anaesthesia: methods and techniques
- 2.1.7. Components of general anaesthesia
- 2.1.8. Narcosis
- 2.1.9. Neuromuscular blockade and muscle relaxation
- 2.1.10. Analgesia
- 2.1.11. Inhalational anaesthesia
- 2.1.12. Intravenous anaesthesia
- 2.1.13. Major complications: prevention and treatment (malignant hyperthermia, difficult airways)
- 2.1.14. Local and regional anaesthesia
- 2.1.15. Epidural anaesthesia
- 2.1.16. Spinal anaesthesia
- 2.1.17. Local intravenous anaesthesia
- 2.1.18. Nerve blocks and plexus blocks
- 2.1.19. Major complications: prevention and treatment
- 2.1.20. Anaesthesia for special situations
- 2.1.21. Day case surgery
- 2.1.22. Postoperative care (safe in-theatre recovery, transport and handover in the post-anaesthesia care area)
- 2.1.23. Postoperative recovery (including assessment of readiness to discharge, post-operative consultation etc)
- 2.1.24. Later postoperative management including transfusion and fluid therapy
- 2.1.25. Postoperative pain
- 2.1.26. Control of nausea and vomiting

- 2.1.27. Communication with patients, relatives, nurses, and other health care personnel, taking into respectful account of differences in language, religion, culture, gender etc)
- 2.2. Conduct of Anaesthesia
  - 2.2.1. Application of cardiac physiology and interpretation of cardiac variables of electrocardiography, blood pressure, heart rate, cardiac output, oxygen content etc
  - 2.2.2. Application of respiratory physiology and interpretation of respiratory variables of respiratory mechanics (including mechanical ventilation), gas exchange, respiratory reserve etc
  - 2.2.3. Application neuromuscular physiology, pharmacology and interpretation of monitored variables and neuromuscular blockade
  - 2.2.4. Applied pharmacology and variability in drug response
  - 2.2.5. Communication with patients, relatives, nurses, and other health care personnel
  - 2.2.6. Management of the airway and intraoperative complications outlined in difficult airway guidelines
  - 2.2.7. Selection and planning of the anaesthesia technique
  - 2.2.8. Common regional anaesthesia techniques (eg epidural and spinal anaesthesia and upper limb blocks)
  - 2.2.9. Decision-making relating to postponement or cancellation of surgery
  - 2.2.10. Routine inhalation and intravenous inductions
  - 2.2.11. Maintenance of anaesthesia
  - 2.2.12. Maintenance of accurate medical and anaesthesia records
- 2.3. Clinical Skills
  - 2.3.1. Maintaining a patent airway (using airway guidelines)
  - 2.3.2. Rapid sequence induction
  - 2.3.3. ECG recording and interpretation
  - 2.3.4. Advanced Life Support
  - 2.3.5. Lumber puncture
  - 2.3.6. Aseptic techniques
  - 2.3.7. Blood sampling for culture, gas analysis, routine tests.

## Appendix III

### 3. *Technical equipment and monitoring*

#### 3.1. Equipment

- 3.1.1. Central gas supplies
- 3.1.2. Anaesthetic machines and systems
- 3.1.3. Ventilators
- 3.1.4. Ventilation systems
- 3.1.5. Scavenger systems
- 3.1.6. Equipment for blood administration, haemodilution and blood sparing techniques
- 3.1.7. Pacemakers
- 3.1.8. Defibrillators
- 3.2. Monitoring
  - 3.2.1. Measuring pressure, flow and volume of gases with respect to anaesthetic apparatus
  - 3.2.2. Analysis and monitoring of breathing including capnography
  - 3.2.3. Gas and vapour concentrations
  - 3.2.4. Pulse oximetry
  - 3.2.5. Electrocardiogram
  - 3.2.6. Arterial pressure and haemodynamics
  - 3.2.7. Cardiac function
  - 3.2.8. Neuromuscular transmission
  - 3.2.9. Temperature
  - 3.2.10. Level of sedation
  - 3.2.11. Electrical safety

## Appendix IV

4. Critical Care Medicine
  - 4.1. Respiratory system
    - 4.1.1. Monitoring of the respiratory system
    - 4.1.2. Diagnostic investigations
    - 4.1.3. Oxygen therapy
    - 4.1.4. Artificial ventilation
    - 4.1.5. Artificial airway
    - 4.1.6. Management of postoperative pulmonary complications
    - 4.1.7. Management of respiratory failure
  - 4.2. Cardiovascular system
    - 4.2.1. Monitoring of the cardiovascular system
    - 4.2.2. Diagnostic investigations
    - 4.2.3. Myocardial infarction
    - 4.2.4. Cardiac failure
    - 4.2.5. Cardiogenic shock and other types of shock
    - 4.2.6. Management of haemorrhage
    - 4.2.7. Haemostasis, thrombosis
  - 4.3. Central Nervous System
    - 4.3.1. Head injury
    - 4.3.2. Multitrauma
    - 4.3.3. Sepsis
    - 4.3.4. Care of the unconscious patient regardless of aetiology
    - 4.3.5. Sedation
  - 4.4. Fluid, electrolyte, nutrition, and acid-base disorders
  - 4.5. Care of the patient with multiple organ system failure, injury or disease
  - 4.6. Care of the patient requiring life support techniques
    - 4.6.1. Renal failure
    - 4.6.2. Hepatic failure
  - 4.7. Understanding and treatment of underlying disease
  - 4.8. Principles of hyperbaric oxygen therapy
  - 4.9. Communication skills
    - 4.9.1. Communication with patients and relatives

## Appendix V

5. Pain Management
  - 5.1. Opioids
  - 5.2. Non-steroidal anti-inflammatory drugs
  - 5.3. Other systemic analgesics including adjuvants
  - 5.4. Neurolytics
  - 5.5. Local anaesthetic agents
  - 5.6. Anatomy and physiology of pain
  - 5.7. Peripheral mechanisms of pain
  - 5.8. Central mechanisms for pain transmission
  - 5.9. Pain modulation
  - 5.10. Factors which perpetuate pain
  - 5.11. Psychological aspects of pain
  - 5.12. General principles of pain evaluation and management
  - 5.13. Pain assessment
  - 5.14. History taking and physical examination in patients suffering from postoperative, cancer, and neuropathic pain;
  - 5.15. Pain measurement in man, basic concepts and bias, scoring systems (VAS, VRS, NRS, etc.);
  - 5.16. Psychological aspects of pain (individual differences, sociocultural influence, situational and environmental factors, the family and pain).
  - 5.17. Techniques
  - 5.18. Transcutaneous nerve stimulation
  - 5.19. Peri-spinal opioid administration systems
  - 5.20. Frequently used analgesic nerve blocks (diagnostic purposes and pain control)
  - 5.21. Surgical and nonsurgical methods
  - 5.22. Neurosurgical pain relieving procedures (basic knowledge, indications, contraindications, and complications)
  - 5.23. Psychological, psychiatric, and behavioural interventions
  - 5.24. Multidisciplinary pain management
  - 5.25. Acute pain
  - 5.26. Postoperative pain (mechanisms, physiological effects, treatment modalities, acute pain service)
  - 5.27. Pain following trauma

- 5.28. Acute pain in children
- 5.29. Chronic pain
- 5.30. Diagnostic characteristics and treatment modalities of:
  - 5.30.1. Headaches (migraine, tension headache, headache of cervical origin, cluster headache, atypical facial pain, trigeminal neuralgia);
  - 5.30.2. Low back pain (anterior and posterior compartment syndrome, radicular and pseudoradicular syndrome);
  - 5.30.3. Neuropathic pain and pain syndromes (deafferentation pain, phantom pain, sympathetic reflex dystrophia, causalgia, neuromata, postherpetic neuralgia, central thalamic pain);
  - 5.30.4. Cancer pain
    - 5.30.4.1. Pharmacological treatment with opioids, NSAIDs, acetaminophen, antidepressant drugs, anticonvulsant drugs and other mixed agents (coanalgesics);
    - 5.30.4.2. indications and treatment possibilities using peri-spinal opioid administration systems;
    - 5.30.4.3. transcutaneous nerve stimulation: indications and procedures;
    - 5.30.4.4. indications and treatment modalities using specific radiofrequency and neurolytic blockade techniques.
    - 5.30.4.5. Case management and communication skills
    - 5.30.4.6. Show a relevant attitude towards patients suffering from chronic pain
    - 5.30.4.7. establish an acceptable contact with the patient and his/her family;
    - 5.30.4.8. set up and maintain an acceptable contact with nurses, social workers, medical psychologists, psychiatrists, other consulting specialists, and the general practitioner;
    - 5.30.4.9. show abilities of self confidence, knowledge of his/her own functioning, and self criticism;
    - 5.30.4.10. make adequate patient records.